JUNE, 1957

TRAFFIC ENGINEERING

- Has Traffic Engineering Become of Age?
- Intersection Design Principles
- Accentuate the Positive
- Summary of Driveway Standards

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vandalism tests

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Actually, the tests show overlaid plywood has considerably more stamina, and maintains better message legibility after damage than either steel or aluminum. Glass fiber signs, apparently, just aren't in it when it comes to shrugging off abuse.

MATERIAL / TEST	OVERLAID PLYWOOD[1]	ALUMINUM[2]	STEEL[3]	GLASS-FIBER[4]
Flying objects	Fair	Fair	Fair	Fair
Knockdown	Good	Fair	Bad	Poor
Gunfire	Good	Poor	Bad	Fair
Bending (Machine)	Good	Fair	Good	Bad
Racking (Hand)	Good	Good	Very Poor	Very Poor
Average Rating	Good	Fair	Poor	Poor

1. OVERLAID PLYWOOD (both medium and high density) ⅝" thick, 5-ply. Weight: 7 lbs.
2. ALUMINUM—6061-T6 type .081" thick. Weight: 5 lbs.
3. STEEL—16 gauge bonderized. Weight: 11 lbs.
4. GLASS FIBER—resin bonded glass fiber approx. .0145" thick. Weight: 5 lbs.

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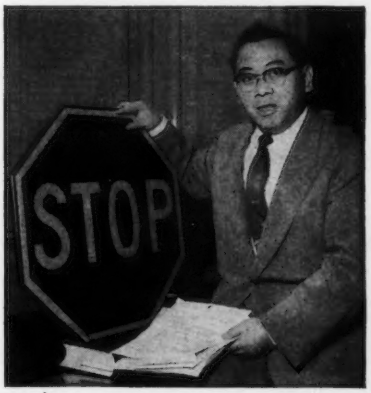
The City of Tacoma (Wash.) has sharply reduced costs by switching to PlyGlaze traffic control and regulatory signs. Of the city's almost 8,000 signs, 7,380 are PlyGlaze, and the others are being replaced as they are damaged. About 60% are reflectorized.

According to Yosh Kosai, city traffic engineer, the PlyGlaze signs have two important advantages: 1. *Cost;* based on current standards and specifications, PlyGlaze signs are less expensive than metal. 2. *Durability;* PlyGlaze signs last longer. Vandals can't wrap them around posts, nor do they chip or rust when struck by rocks or bullets.

The changeover was initiated by R. E. Schmidt, Kosai's predecessor. The first PlyGlaze signs were installed in 1951. After 6 years appearance and legibility remain excellent. The only significant damage has been from knock-down and



even though the posts had to be replaced, the signs themselves have remained in service.

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COVER: A typical interchange approach sign on a modern controlled-access highway. Photo from the Ohio Turnpike Commission.

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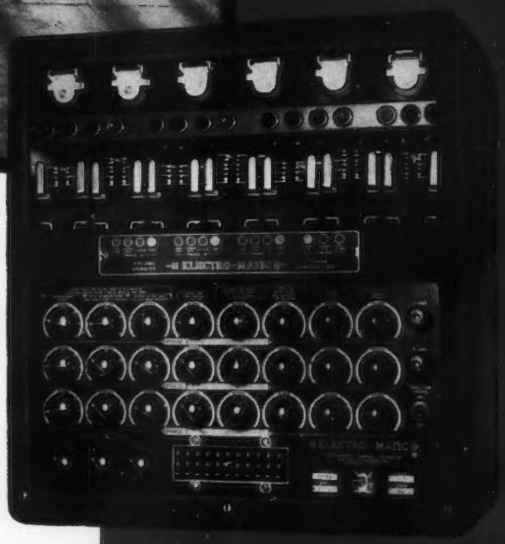

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Frankly Speaking . . .

ANYONE WHO HAS TRAVELED EXTENSIVELY over what is currently known as the Inter-state Highway System of the United States can testify to its general inadequacy. Pavements are frequently too narrow and in poor condition. Shoulders are not satisfactory. There is much intereference from cross traffic. Alignment is not satisfactory. One could go on listing the current inadequacies of a large part of the U. S. and state highways throughout the country. This is true (with the exception of the turnpike) no matter in what direction one travels.

Having recently traveled some 3,500 miles on U. S. and state highways, I am prepared to testify that for the most part these highways are not satisfactory and that the exception to this statement is rare. Traveling south out of Chicago, one will find some sections of divided highways (in the vicinity of Atlanta for instance), but on the other hand one will find that too many sections of the U. S. highway system still pass through the center of cities and along the main streets. Consider Madisonville, Kentucky as one of the hundreds of examples.

No one familiar with the highway system would dispute the statement that extensive improvement is required.

At the same time it is still apparent on stretches of new highway that these new portions have been engineered rather than planned. When I say engineered, I mean that the dominant factors considered have been alignment and cost. I would be the last person to dispute the importance of either alignment or cost. There may, however, be other factors which are equally important or more important. I refer to land use abutting upon highways and the potentiality of land use. There has been a tendency in recent years for industry to locate adjacent to main highways. The highways surrounding Toronto and the perimeter highway around Boston are examples of this trend. Obviously, in the building of the new highway system we are not going to permit industries to locate promiscuously adjacent to the highways, because this would interfere with highway use. There will be limited access, which means that industry (and commercial enterprises) will tend to locate adjacent to access points, or on service drives which are fairly handy to access points on the limited access highway system. In the interest of alignment and cost, no highway system should be designed so as to eliminate from use what is otherwise a potential and optimum industrial site. Sometimes at a slight additional cost, and frequently at no additional cost, highways can be located in metropolitan areas so as to serve industrial and commercial developments, rather than so they obstruct urban renewal.

There must be a recognition also that it will never be possible to move all of the people in our metropolitan areas who wish to travel in private automobiles and to provide them with downtown storage space. It is inevitable, if we are going to solve the problem of the movement of people, that we must improve our mass transportation facilities, and it is just as inevitable, therefore, that mass transit become an integral part of many of the highways serving our metropolitan areas.

This calls for a new approach to highway planning and new thinking. Most important, it calls for the planning of highway systems in relation to urban land use and in relation to comprehensive development plans for our metropolitan areas.

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Has Traffic Engineering Become of Age?

by J. Carl McMonagle
President Institute of Traffic Engineers
and Assistant Director
Highway Traffic Safety Center,
Michigan State University

WHEN DOES A MAN BECOME A MAN?

I think this is the real question before us when we are confronted with the question, "Has Traffic Engineering Become of Age? As number of years go, all can accept the conclusion that traffic engineering has become of age.

The real question lies in considering the maturity and the stature the profession has reached. The answer can only be found in a frank appraisal of traffic engineering as a profession.

Without crying "hallelujah" — and at the same time, without crying "doom"—the traffic engineer can only arrive at an answer by taking an honest inventory of his profession's problems, accomplishments, and future prospects in the field of highway transportation.

I propose to consider the questions of traffic engineering's becoming of age, of its maturity and its stature. In doing this, I believe it is considered proper form in any report to state your conclusions first and then to detail how these conclusions have been reached. Following this format, I'll state my own considered answer and then my reasons.

I have promised a considered answer. For that reason, I must give a qualified answer.

I feel, first, that traffic engineering has become of age. I sincerely feel that the profession has learned its "sums" —and that it has learned them well.

But now for my qualification:

Though I feel that traffic engineering has become of age, I do not feel that the profession of traffic engineering has yet reached the full stature of manhood.

I think we have developed much as a growing boy develops. In the early years, we depend upon our elders. In the early teen-age years, as we know, a youngster often feels that his elders

J. Carl McMonagle

are the most conservative, reactionary, unenlightened persons imaginable. He feels they exhibit such tendencies to a fault.

Becoming of age may mean that a person has acquired the necessary training and skills to go through life. In other words, he has learned his "sums." Yet this does not mean he has gained the full insight and the seasoning and experience necessary to apply his knowledge to the fullest extent.

In much the same way, traffic engineering has developed through the years. The profession has evolved the tools and perfected the techniques. In this respect, it has become of age. The services of the traffic engineer have been needed and they have been recognized.

The challenge now is in the integration of traffic engineering with the other engineering functions represented on the highway team. Traffic engineering must develop further to meet that challenge if traffic and highway operations are to be realized on the scale which modern technology and the motoring, tax-paying public demand.

Becoming "of age"—really developing in stature — as a member of the highway team is a must if we, as traffic engineers, are to help give motorists the roads they can drive conveniently, economically, and safely.

On this basis, what can traffic engineering learn from the past? What does the future hold?

First, from the growing years, a picture can be developed showing what the traffic engineer should be and what he should be doing.

The Institute of Traffic Engineers supports this definition:

"Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways and abutting lands, and with traffic operation thereon, as their use is related to the safe, convenient, and economic transportation of people and goods."

First and foremost, then, the traffic engineer is a trained highway engineer. In addition, he has acquired training and skills in the operation of traffic.

Traffic engineering functions include:

1—Collection, analysis, and interpretation of factual data.

2—Traffic planning.

3—Traffic design.

4—Traffic operational measures.

The traffic engineer is a comparative newcomer to the highway family. He didn't thrust himself upon the scene. On the contrary, he was invited. His services were demanded and commanded when unforeseen complexities of vehicular and pedestrian traffic threatened to strangle our present day traffic circulation.

Today, the traffic engineer can point with some pride to his past accomplishments. In addition to acquiring the needed training and skills, he has gained much practical experience. He

has been meeting a challenge that was given him in the beginning—the challenge of making deficient and inadequate highway facilities operate as acceptably as possible.

Today, the traffic engineer is now in a position to make an equally valuable contribution to the new super-systems which are on the planning boards.

Based on this past record, the traffic engineer can honestly feel that his profession has become of age.

But becoming of age does not eliminate all problems. Just as growing-up as a person adds complications, so is the traffic engineer confronted with new and broader problems.

The broad problem now is to continually prove the worth of traffic engineering and to grow into the traffic engineer's rightful place with the other members of the highway team — the planners, designers, construction and maintenance engineers. The traffic engineer must prove his stature because the operation of traffic upon our highway facilities is an equally specialized function.

The profession must prove its worth by supplying a need and by making a mature and adult contribution to the solution of our highway and transportation problems.

But just what are the problems — present and future — that this team must face up to?

The basic clues to the problems are in five new concepts. These five new concepts must be recognized and adopted if the profession of traffic engineering is to help the American public get the highway system users and our modern economy demand.

Adoption of these new concepts, based on fact, research and mature judgment is vital. They are:

1—The need for change in our appraisal of driver needs, desires and abilities.

2—The need for change in our overall concept of state and national highway needs.

3—The need for new standards to project a highway system that will meet future needs.

4—The need for a more realistic basis of financial support.

5—The need for new concepts of management of our highway and transportation system.

These are the areas in which new thinking is needed. Significantly, they are *all* areas in which the traffic engineer can make major contributions.

New thinking is needed because no single one of these five needs is completely answered by the Federal Aid Highway Act of 1956. In fact, some are made more pressing by this legislation. They become more important than ever if the intended benefits of this legislation are to be realized in the foreseeable future.

An analysis is necessary of each of the five indicated areas of need — an analysis from the standpoint of the role of the traffic engineer as his profession strives to reach its rightful stature.

First is the need for new thinking concerning the needs, desires and abilities of the drivers who must use our highways.

After 50 years of indifference, of complacency, and in rare instances of outright contempt for the people who make highways possible, the day has come when a shocking fact confronts highway officialdom: The highway user is the undisputed boss. His desires, his convenience, his safety are paramount in the highway industry.

The traffic engineer is in a unique position to insure improved traffic operation which will provide rapid, time-saving, economical highway facilities to and from those locations desired by users.

Traffic engineering can become the conscience of the industry, and the demanding voice of highway users. Traffic engineering—recognized for isolating, identifying and interpreting the wishes of highway users—must also be recognized as representing the interests of users in achieving their known, paramount desires.

The second area of need is in the concept of actual state and national highway needs.

We live in a dynamic age. Our economy is expanding. It will continue to expand. And as long as our economy expands — as long as population increases—we are not likely to catch up with our highway needs *if* our present thinking continues.

We have not, as yet, seen a realistic appraisal of highway needs.

Accordingly, the traffic engineer must immediately stop being a party to constant improvising on today's system of paths and trails inherited from the beginning of the century.

This article is adapted from speeches by President McMonagle at meetings of several local sections and elsewhere.

This system has been extended, patched and modified until it no longer serves our needs. Now, the traffic engineer must insure that highway needs are realistically appraised to prevent our highways from leading into chaos in the future.

This need is directly related to the third area of need — new highway standards that will allow planning to move beyond today and to reach out into tomorrow.

It is a sad commentary that our standards for highway construction are determined largely by dollar costs rather than by user benefits and modern needs. It is all too typical of highway administration today that we continue to build unsafe, inadequate roads and structures because it would cost more to build them right.

Proved principles of traffic operations, as the traffic engineer has analyzed them and determined them to be, must be made as essential to our highway system as the concrete or asphalt surfaces laid down are.

The job of the traffic engineer is clear. He must obtain stature at the highest staff level. He must be able to counsel and advise design engineers and highway management. He must be able to get them to willingly accept these concepts.

Now, what about need number four —the need for a realistic basis for financial support of our highway requirements?

Unfortunately, the appropriations contemplated in our federal legislation are woefully inadequate. The fiscal planning at the federal level is as unrealistic as most of us know it to be at state and local levels.

Only when the federal government will return to the states all of the highway user tax it collects, less the costs involved in the operation of the Bureau of Public Roads, can some semblance of realistic fiscal operation in highway system development be initiated.

Until then, traffic engineers must hold forth for such a realistic approach to the fiscal problems — not only at the federal level, but at state and local levels as well.

Meanwhile, it is within our domain as traffic engineers to protect the investment of highway user funds in our highway systems by insisting on modern principles of traffic design. Traffic engineers must insure that new systems will not become obsolete before they are opened to traffic!

The traffic engineer must insist on maximum safety; he must protect lives and property and materially reduce economic costs of accidents on our highways.

These four areas represent important needs. But there is another — a fifth — and if any single objective is more important than another, it probably is in the streamlining and major overhaul of highway management.

The manifest failures of highway administrators at all levels may easily be explained by the monopoly factor. The motorist and the trucker are limited to the roads and streets which exist. There is no alternative available.

This monopoly extends to the tax structure as well. The motorist has no choice. He must pay the fuel, weight, registration, personal property and other taxes which his various governmental units levy.

He is not permitted to exercise a choice. He pays the common tax or taxes, or he doesn't drive on the highway. And he must travel the surface which happens to be available, whether it meets his travel desire, whether or not it is a death trap, whether or not it is antiquated, obsolete, or just plain uneconomical.

The highway user is and has been the captive of the industry he created and which exists only because of him. In this respect, the situation is wholly unique in the world we know.

Backed by the monopoly of taxation and of routes, it is perhaps understandable that good service to the customer has not been a prime objective of highway administration. The element of competition is lacking.

Let's examine highway administration briefly. With only rare exceptions, the governmental agencies at all levels are still operating as they did 20 years ago. Agency after agency is bogged down right now in attempting to get the expanded highway program moving. We hear, most often, the alibi that "we can't get enough professional and technical manpower to do the job."

Almost without exception the agencies COULD do the job, adequately, in the time available, and do it better with the personnel available . . . *IF* they are properly organized along functional and administrative lines.

I don't mean that the highway industry doesn't need more engineers and more technical personnel. Yet even in the use of existing manpower, highway administration has failed.

A major reorganization of highway administration would, among other notable changes, advance traffic engineering to the top level of highway engineering and management. And until the voice and values of traffic engineering are established at the highest staff level, the motorist will not get the safe, efficient, economical highway systems for which he is paying.

Every traffic engineer can make a significant contribution to the streamlining of highway administration if he will frequently pause to assess his daily activities as a part of over-all administration.

Every traffic engineer can put himself in the place of his top administrator. He can learn to recognize considerations affecting the problem which, in his own mind, may be all-inclusive. The traffic engineer cannot compromise on essential principles. Yet he must achieve an improved working arrangement with his administrator. He must make a serious effort to understand administrations problems. He must temper his judgments against realistic considerations which may also be involved and upon which the administrator must exercise judgment.

These are the needs . . . and these are the ways in which traffic engineers as a professional group can contribute, and can contribute at once, to the solution of the needs.

As the traffic engineering profession looks to the future, it is evident that the scope of the problem is as broad as are our future highway transportation needs.

It is also clear that the contribution the profession can make is limited only by how close . . . or by how far traffic engineers establish the horizons of their thinking and their goals.

In short, I see the basic problem confronting traffic engineers simply as one of "thinking big." They are confronted with the problem of broadening horizons to the extent that the profession can make its rightful contribution to the realization of highway transportation needs.

To the extent that traffic engineers have acquired knowledge and training and experience to do the job, the profession has become of age.

The where-with-all is available to isolate, identify and interpret the wishes of highway users. We now have the dual responsibility of representing these desires on the highway team — whether as an individual, whether our job has to do with interstate, state, county or local highway facilities.

What do we need then, as a profession, to advance further — to pass on from merely becoming of age and reach true "manhood?"

Traffic engineering must stop looking up to our "elders." The traffic engineer must realize he is now to be accepted in the "council of the elders" as an equal member. He must maintain his status and grow only as he brings into the "council chambers" a mature viewpoint.

Traffic engineers have the skills and training. Each member of the profession must now apply these to the best advantage. He must learn to temper his judgments. He must learn diplomacy. He must practice salesmanship that reaches the stature of statesmanship. He must learn to recognize and respect the problems and considerations of others.

As long as inadequacies exist in our highway transportation facilities — as long as operational problems exist on those facilities — traffic engineers are confronted with a challenge that will require all of our talents and tact.

Never has ITE and its members been faced with a more important time of decision. Never before has the need been so great that the profession of traffic engineering achieve and maintain its rightfully mature stature in the field of highway and transportation administration.

The rewards for progressing from simply being "of age" to true adulthood will be great. We will *know* that . . . as a member of the highway team . . . the profession of traffic engineering truly contributed to giving highway users roads they can drive — conveniently . . . economically . . . and safely!

Intersection Design Principles

by Fred W. Hurd
(Mem., ITE), Director,
Yale Bureau of Highway Traffic

This paper was originally prepared for presentation before the Committee on Traffic of the American Association of State Highway Officials at the meeting in Atlantic City, N. J., November 1956.

ONLY THREE MANEUVERS between traffic flows take place at intersections. These are: merging, diverging and crossing. No substitutions may be made for merging and diverging, but the crossing maneuver may be performed at: (1) a "direct" crossing, (2) a weaving section, or (3) a grade separated crossing. Figure 1 shows the various classes of intersection maneuvers.

In planning the geometry of an intersection, the decision to be made first is, usually, how the crossing flows will be handled. If the crossing maneuver is to be "direct," the intersection becomes an ordinary grade intersection. When all crossings are to be accomplished by weaving, a traffic circle is produced. If they are to be bridged crossings, one of the many different types of grade separated intersections is formed.

The right turn at an intersection rarely presents a serious design problem, but the left turn (in countries where traffic keeps to the right) is more difficult to accommodate because it creates crossing conflicts with other flows. The design treatments of these secondary crossing flows determine the arrangement of maneuver areas at the intersection and therefore may yield any number of geometric design layouts. For this reason, the geometric design of an intersection is subject to many alternate solutions and the "cut and try" process is indicated.

Maneuver Areas

Intersection design is the arrangement of maneuver areas to accommodate the various movements of traffic to be permitted at the intersection. Maneuver areas therefore become the "building blocks" of intersection design.

Figure 2 shows the different types of "at grade" maneuver areas. Multiple maneuver areas should be avoided in design because they offer complex driving conditions and usually require three phase signal control. Elemental and compounded maneuver areas are often employed in design under the conditions to be set forth in this paper.

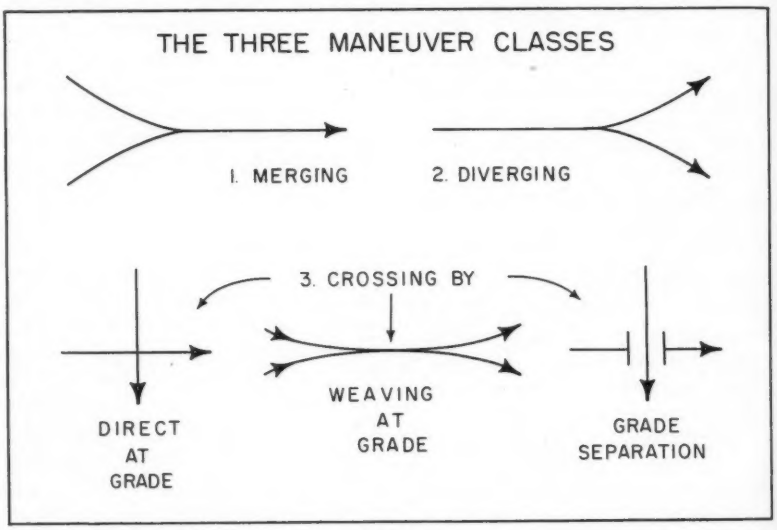


Figure 1

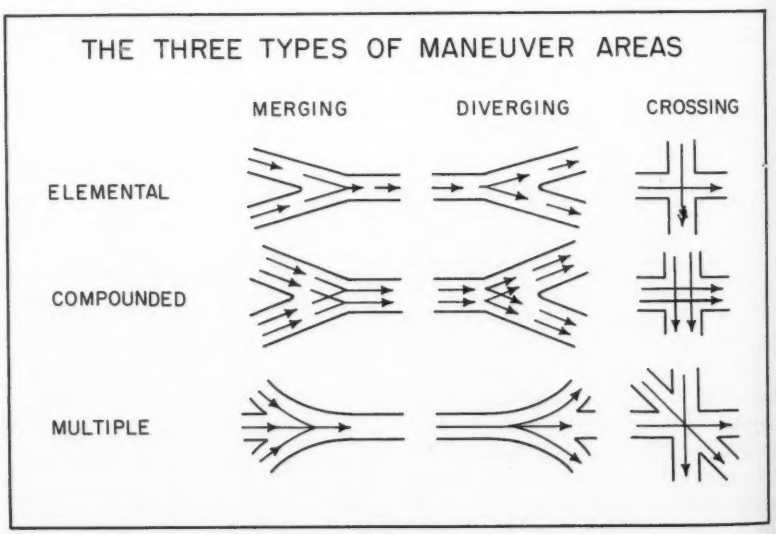


Figure 2

Relative Speed

Relative speed is one of the most important factors in maneuver area design. It is the rate at which intersecting vehicles converge toward each other. Figure 3 shows that relative speed may be expressed as a "resultant" speed vector. As the angle of intersection increases, relative speed increases. Thus, low relative speed is achieved only when the angle of intersection is small.

Relative speed is also a function of difference in the absolute speed of intersecting vehicles. Figure 3 shows that, for small angles, relative speed decreases with decrease in speed differential between intersecting vehicles. It is evident, therefore, that low relative speed is possible only when vehicles intersect at a small angle with a small difference in speed.

The angle of intersecting flows is controlled by design. The differential in speed is also dependent upon design because the alinement of the approaches and departures of the maneuver area determines the speed of intersecting vehicles. For example, acceleration and deceleration lanes are employed to overcome differences in speeds at maneuver areas.

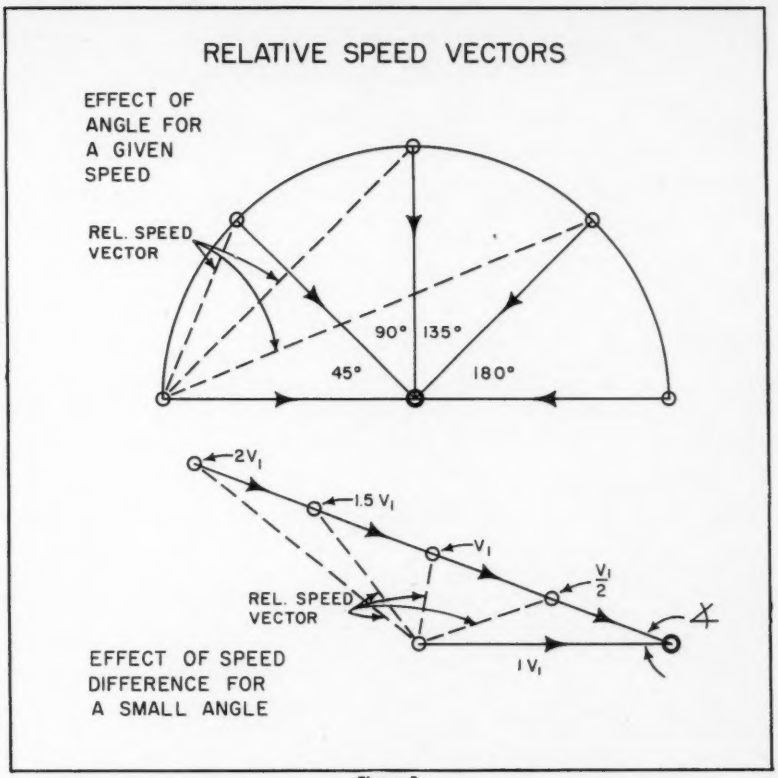


Figure 3

Intersection Safety

Experience has shown that maneuver areas which operate at low relative speed are inherently safe. It has also shown that maneuver areas which operate at high relative speed are inherently unsafe. Figure 4 attempts to illustrate these statements. As illustrated, impact increases with increased angle when intersecting vehicles approach the point of conflict at given speeds, v_1 and v_2. Similarly, the rate at which vehicles traveling in the same direction converge decreases with decreased difference in speeds regardless of the level of the speeds. Thus, it seems logical to credit the safety of low relative speed maneuvers to (1) less impact when an accident does take place, and (2) more time to avoid a potential collision.

Intersection Delay

Maneuver areas which operate at low relative speed do not require intersection traffic control (stop signs or signals) for safety. In fact, stop signs destroy low relative speed by creating speed differentials. An example of this occurs when stop signs are placed at the entrance of a ramp onto a high speed freeway. It is clear, therefore, that intersection design and traffic controls must be in harmony for efficiency in construction and operations. Maneuver areas which operate at high relative speed must be safeguarded by traffic controls (assuming sufficient volume). These controls cause vehicle delays. It has been acknowledged in traffic design for many years that the continuous or steady flow theory is superior to the interrupted flow theory so far as delay to individual vehicles is concerned.

Intersection Capacity

Figure 5 illustrates the flows of traffic at compounded merging and diverging maneuver areas. The supplemental crossing conflicts encountered, shown within the circles, are a source of great confusion and hazard in driving. The bottleneck created by this crossing is sufficient to destroy the additional capacity intended in the design of a multiple lane maneuver area.

Figure 6 is evidence, found on actual

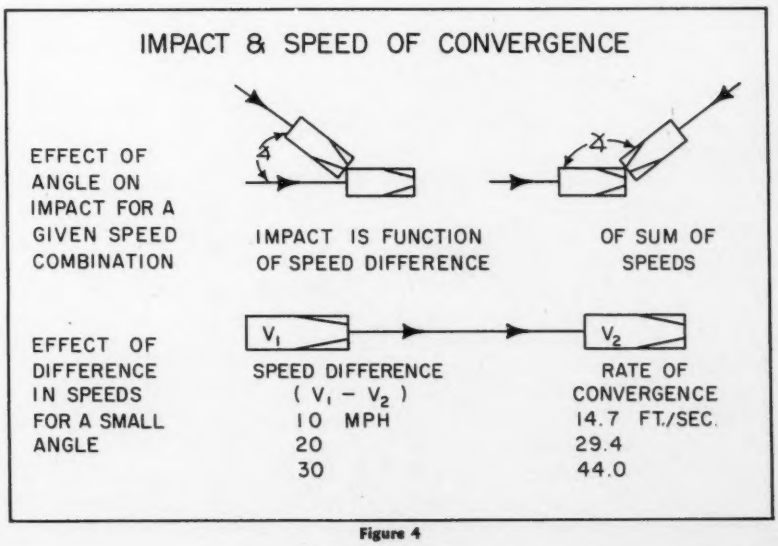


Figure 4

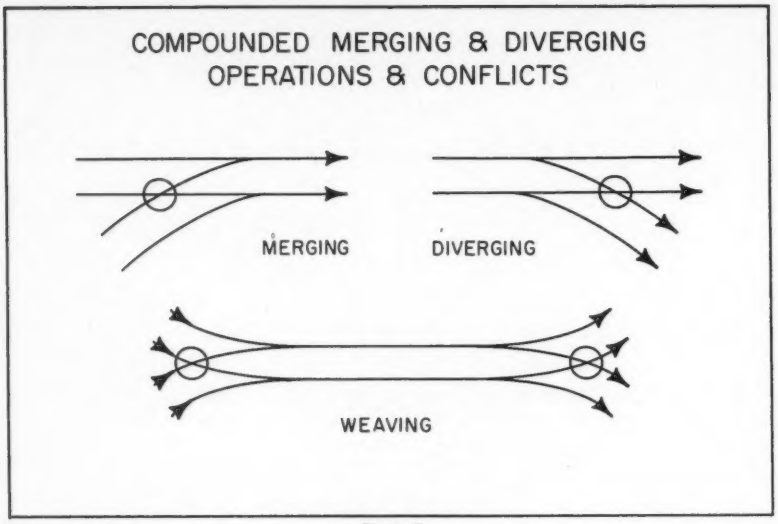


Figure 5

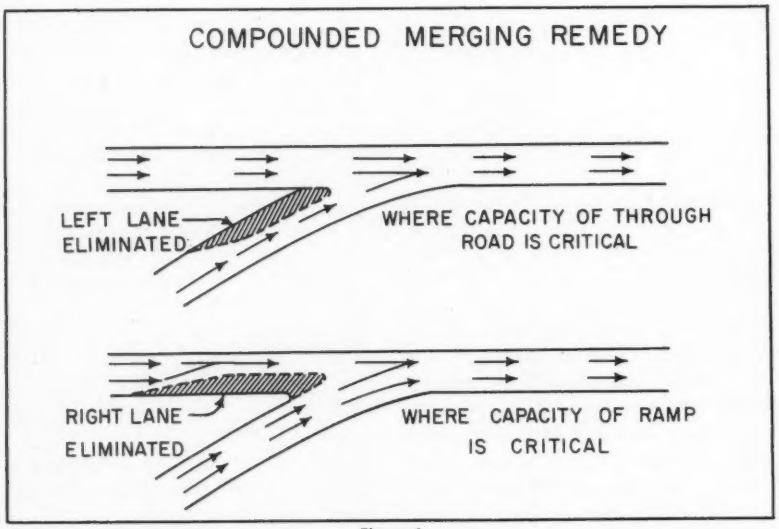

COMPOUNDED MERGING REMEDY
LEFT LANE ELIMINATED
WHERE CAPACITY OF THROUGH ROAD IS CRITICAL
RIGHT LANE ELIMINATED
WHERE CAPACITY OF RAMP IS CRITICAL

Figure 6

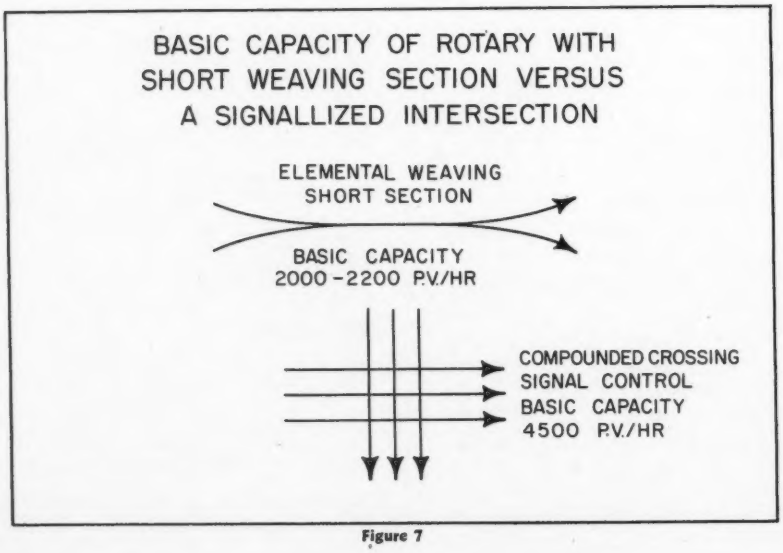


Figure 7

highways, of remedial steps taken to avoid the confusion created by compounded merging maneuver area design. In one of the cases illustrated, through traffic was less critical than merging traffic and one lane of a four-lane divided expressway was eliminated.

The evidence points to the fact that all merging, diverging and weaving maneuver areas intended for continuous flow must be elemental in character. This requirement explains why the capacity of a traffic circle is not increased by increase in number of lanes. The fact that a traffic circle may not accommodate high traffic volumes as well as a conventional signalized intersection is illustrated by Figure 7.

In this figure, it is illustrated that the capacity of an elemental weaving section of short length cannot exceed the capacity of one traffic lane (2,000-2,200 pv/hr.). As stated before, the compounding of a weaving section by providing additional lanes does not appreciably increase its capacity.

The conventional signalized intersection has a basic capacity of about 1,500 passenger vehicles per lane per hour of green. For the intersection of two three lane highways, the total basic capacity becomes 4,500 pv/hr. or more than twice that of the rotary.

In this respect, it may be theorized that capacity may be increased at the cost of increased vehicle delay.

Other Factors Affecting Relative Speed

Many factors in addition to those already mentioned affect relative speed. Pedestrians in the traffic flow, parking or unparking, and any influence extraneous to the maneuver which causes a differential in the speed of intersecting vehicles destroys continuous flow. Pedestrians are unprotected where continuous flows occur.

In intersection design, maneuver areas should be separated from each other in time or space to prevent operational interference of one with another. Figure 8 shows examples of this for right turn, left turn and through traffic.

Crossing maneuver areas designed for high relative speeds should intersect at right angles. Psychologically, the right angle crossing most effectively subjects the driver on the cross-road to through traffic and thereby fosters better observance of stop and

(Continued on page 427)

Accentuate the Positive

by Theodore W. Geiser
General Attorney
New Jersey Highway Authority

This is the text of an address by Mr. Geiser before a meeting of the Metropolitan New York Section of the ITE held March 14, 1957.

An interchange on the Garden State Parkway in northern New Jersey.

VIRTUALLY EVERY PROBLEM arising out of the planning, financing, construction and operation of New Jersey's Garden State Parkway has involved some aspect of engineering on the one hand, and law on the other.

The lawyer, in his more contemplative moods, deplores the fact that the demands of the law leave him but little time to indulge his natural proclivity for engineering. The engineer, meanwhile, considers with some degree of regret the loss sustained by the law when he chose to devote his life to engineering. When some project requiring the attention of both brings them together the results never fail to be stimulating. Neither can resist the opportunity.

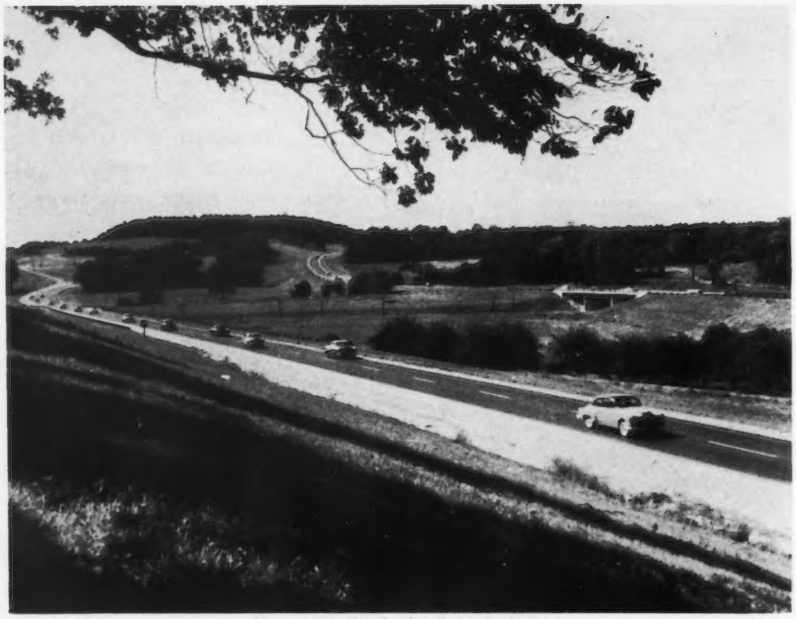
Engineers and lawyers have a common ancestor. Each developed because of fundamental shortcomings of the individual.

Law and lawyers strive to supply the rules by which people may live together (or apart with a minimum of friction). The complex social structure of the United States today is supported by a marvelously light framework. Stretching between the great abutments of the Constitution are the girders of statutory law, a deck paved with court decisions, and finished off with a fretwork of administrative rules and regulations. It presently supports a load of 160 million people, and their property, and it is made entirely of words. Construction, maintenance and operation has been to a very large extent the responsibility of lawyers. The ultimate in anarchy is exemplified in the well known remark of the conspirator in Shakespeare's "Henry VI" who said, "The first thing we do, lets kill all the lawyers."

Engineering and engineers are concerned with the physical limitations of human beings. The fundamental objective of engineering must be the multiplication of energy, the extension of the strength of the individual member of society and of society as a whole. Engineering produced a wheeled vehicle, thus increasing the amount of weight which could be moved by human strength, and engineering has further multiplied this advantage with the development of roads and engines, to a point where the individual automobile driver is a colossus of power and strength even when measured against the standards of twenty years ago.

Unfortunately, the development of the vehicle has outstripped the development of the laws and rules necessary to permit the full realization of this strength without danger to the life or property of others. When I speak of laws, I do not mean to limit the word to regulatory laws, but also to include that class of legislation which would provide for the construction of facilities which would permit efficient use of the vehicles with a minimum of hazard to others. But the law, and lawyers, cannot supply this deficiency without the advice of trained technicians. This contribution must come from the engineering profession, and specifically from traffic engineers.

I cannot speak authoritatively on the subject, but I put it to you that technological advancement in the development of the automobile has gained a long head start over the planning and development of the facilities necessary to accommodate these vehicles. It is a natural result of this situation to find that a large proportion of the efforts of the Institute of Traffic Engi-



A scene on the Garden State Parkway.

neers, the American Association of State Highway Officials and the National Committee on Uniform Traffic Laws and Ordinances is directed toward regulatory matters. This negative approach is the unavoidable product of having problems at hand against which no provision has been made by way of foresight. In the February 1957 issue of TRAFFIC ENGINEERING, Fred W. Hurd, Director of District 1 of this Institute, commenting upon the current wide interest in highway safety said, "There is no question about the need for traffic regulations and good enforcement to curb extreme and irrational driving practices. However, the traffic engineer has constructive measures as well as regulatory measures in his professional repertoire. Only the traffic engineer may logically choose between this alternate approach in the solution of specific traffic accident problems. The traffic engineer who accepts the doctrine of driver regimentation for safety without careful study of the inherent safety features of the constructive approach is doing only one half of his job."

A few moments ago I spoke of the structure of our society, the delicate network of words which supports our civilization. I neglected to mention that the structure has taken 150 years to build and has, as a result, a Victorian aspect in some of its details. The adjustment of government to keep pace with the demands of a growing population for the advantages which technological developments have provided is difficult. The municipal corporation, whose jurisdiction in many cases was established by the limits of effective communication more than a century ago, finds itself engulfed in a sea of children in need of educational facilities, beset by residents requiring water and modern sewerage facilities, improved local roads and better housing.

County, state and Federal highway jurisdiction has always been superimposed upon municipal jurisdiction. Until recently, the advent of new highway construction in a municipality by one of these supervening agencies was not only accepted but welcomed by local government, in the certain knowledge that such arteries would bring commercial and residential growth to the community. Today we see the result in New York and northern New Jersey, where an immense concentration of commerce and industry sprawls over hundreds of square miles and dozens of municipalities. This vast complex has grown and spread almost without regard to, perhaps despite, political boundaries. Nevertheless, these boundaries continue to exist.

Greater New York City, an economic organism, is nurtured by the rest of the country and the world. Speedy, efficient transportation of goods and people is indispensable to the life and growth of the unit. The versatile motor vehicle, the truck, the bus, the automobile have become essential ingredients in the transportation pattern. The conduits through which this traffic must pass transcend the political boundaries. The effect of each county, state or Federal highway upon the municipality through which it passes is considerable. Traffic patterns within each such enclave are seriously affected. Local officials are quite properly concerned over the necessary adjustment which the municipality must make to the new condition. Too frequently, the action taken by the municipality is dictated entirely by considerations of self-interest within the political entity.

As an example, in the recent New Jersey case of *County of Bergen v Borough of Rutherford*, the municipality adopted a system of truck routes in the borough which ran counter-clockwise around the borders of the borough and included only county roads, which, of course, the county had the duty to maintain. In striking down the ordinance, the New Jersey Superior Court pointed out that "... if each separate municipality in Bergen County, which contains 70 municipalities, were to pass conflicting ordinances establishing truck routes, the county road system would be completely and ultimately destroyed in a very short time."

Whatever the problems which may have been created by the county, state or Federal highway bisecting a community ten or twenty years ago may have been, they were more than offset by the advantages which these new facilities brought. While these highways remained at grade, traffic distribution at points of intersection with other traffic facilities within the community was fairly regular.

The growth forecast by the local prophets came. Of course, there were other contributing factors, but highways have been in a large measure responsible for the expansion of Greater New York City to include an area with outer limits in some cases 40 miles from Manhattan. The urban area spread outwards by a process of envelopment of communities which a few years ago were considered suburban. This expansion called for new and better highways, not only for the purpose of moving goods in and out of this heavily congested area, but to permit the tremendous working force which gives Greater New York City its vitality to live outside the business perimeter. Not only new and better highways, but a different type of high-

way facility was required. With the advent of the limited access highway, municipal officials in the communities through which these facilities passed found themselves on the horns of a dilemma. By and large, the people within the community seemed to find such facilities desirable, provided, of course, their property was not taken by the agency constructing the road, and provided it did not actually go through their backyards. On the other hand, these superhighways pass through communities bridging only the principal highways and streets, creating, in effect, a Chinese wall which radically alters the local traffic situation. A complete interchange within the municipality may increase traffic on a given local thoroughfare formerly carrying a capacity load, to an impossible point. Even where there is no connection with the superhighway, streets carrying traffic over or under the express facility must assume the load formerly carried by all of the local roads deadened by construction of the superhighway. The situation is all the more irritating since only a small fraction of the traffic volume involved at interchanges is local in the sense that it has a point of origin or destination within the political boundaries of the municipality.

There is no doubt that, given their head, municipal officials will not only be opposed to the intrusion of the superhighway in their particular communities but will, in many cases, employ every conceivable means to frustrate its construction or to dictate its location. Illustrating the reaction of the law to this situation, are three recent decisions of the Supreme Court of New Jersey. In one, *Town of Bloomfield v New Jersey Highway Authority*, where the municipality contested the right of the Highway Authority to locate a service area on the Garden State Parkway at a point within the Town of Bloomfield zoned for residential use, the Court said:

"The need for new highway construction has been expressly recognized by the Federal Government and the various states—the belief is widespread that the need is very urgent and that we cannot afford to wait. Along with New Jersey, our neighboring states are now in the midst of the building or extension of vital freeways and parkways but serious local resistance along the routes of construction is by no means uncommon. Illustrative is the recent instance in which the State of Connecticut was faced with objections by residents of Darien to the establishment of a service area in their town along the route of the New England Thru-Way; as expressed in the *New York Times* of March 13, 1955, they thought the installations would be far better in Norwalk, which does not want them either. And more recently the *New York Times* carried a story (April 6, 1955) of the widespread objections by local communities and residents to a proposed expressway from the George Washington Bridge to the Passaic River; one of the residents voiced the familiar attitude that he was not one to stand in the way of progress but he wanted to be assured that the road would not cross near his home. Such objections to the encroachments of new highways and their untoward incidents are, of course, understandable and are to be sympathetically heard and fairly considered by the agency charged with the high responsibility of effectuating the public objective with due regard for individual rights. But these rights, valuable as they are, must, in the public interest, give way to the greater good for the greater number and where the agency has, within its statutory delegation, conscientiously selected the route of the highway and the sites of its incidental facilities, it is highly proper that the courts not intrude. Ch. State ex rel. Helsel v Board of County Com'rs, supra (79 N.E. 2d 709): the law does not permit courts to select the location of sites for the establishment of essential public enterprises.

In *Elizabeth v New Jersey Turnpike Authority*. and in *Newark v New Jersey Turnpike Authority*, the court rejected municipal attempts to prevent construction of the New Jersey Turnpike along the route through the city which had been designated by Turnpike officials. In the latter case, Chief Justice Vanderbilt remarked: "The idea that any and every municipality along the route of the proposed turnpike could effectively veto either its location or the manner of its construction by a withholding of consent is in direct conflict with the very concept of a turnpike designed to serve the best interests of the entire state and not merely those of particular localities."

The limited access highway is the product of a positive approach to a problem by competent engineers working with government. The answers to the problems created by limited access highways can be effectively achieved only through the same positive approach. All of the effort and time spent in opposing the advent of the limited access highway might well have been directed toward the planning of adjustments within the municipality so as to accommodate the superhighway with a minimum of aggravation of local problems.

The Institute of Traffic Engineers was founded in 1930. It is the product of a problem which was created in the first instance by engineers. The wheel, the internal combustion engine, the paved highway are all positive contributions toward the optimum in the strength of man. Friction reduces the efficiency of these achievements and that friction includes not only the wear of collisions and other accidents within the traffic flow and the friction produced by other vehicles at the point of access or intersection, but also, and perhaps most important, the friction created by scientific accomplishments within a governmental structure which has not adjusted at the same rate.

It will adjust. It will adjust more readily and efficiently if these problems are approached with the same affirmative approach that went into the planning and construction of the facilities which created them. Haphazard municipal planning in the field of traffic is passing from the scene. The magnitude of the problems will no longer permit amateur diagnosis or treatment. In a short time, it appears that virtually every municipality in the metropolitan area will have engaged the services of a traffic engineer. The municipal traffic engineer, unlike the municipal shade tree commissioner or the municipal sanitation engineer will not be concerned with purely local problems. In Greater New York City, he will be concerned with traffic generally, and his professional obligation must extend beyond the legal boundaries of the municipality which he serves. He cannot discharge this obligation by devising means of keeping traffic outside the corporate limits of the municipality, or once it has entered, by seeing that it is dumped expeditiously into a neighboring community. Nor, in the long run, will he fully discharge his responsibility by

(Continued on page 421)

Traffic News

Methods Reported for Increasing Highway Productivity

The Western Conference on Increasing Highway Engineering Productivity, held in Los Angeles in March, was attended by nearly 500 engineers from across the country. Held to compare and exchange experience in the recent development of new methods of increasing highway engineering productivity, the conference featured the integration of photogrammetry and electronic computor processes.

A report on the conference has been issued by the U. S. Bureau of Public Roads, and the full text of papers presented at the conference is being made available by Mr. H. A. Radzikowski of the Bureau. The report covers the 10 panels and 60 discussion leaders at the conference.

Of particular significance to traffic engineering were discussions of the use of electronic computors in traffic studies and traffic simulations. The work of this panel, under the chairmanship of Mr. C. E. Shumate, Administrative Engineer, Colorado Department of Highways, is summarized below.

Dr. E. E. Blanche of E. E. Blanche and Associates, described electronic computer programs which he developed, tested, and used in the 1956 Washington, D.C., traffic origin and destination studies to reduce the time between the collection of data and the analysis of the data, to perform the summary extraction of results and to project the data to estimates of traffic for 1965 and 1980. The Univac was used to sort, sequence-check, merge, and edit the data.

Individual reports were prepared on the electronic computer for dwelling unit data, internal trips, external trips and taxi and truck data. These were combined into a single report which showed on a zone-to-zone and district-to-district basis the number of automobile trips, taxi trips, total passenger car trips, truck trips, total vehicle trips, automobile and truck passengers, taxi passengers, public transit passengers and total passengers. These data were projected for future years on the basis of future economic characteristics such as population, labor force, employment, land use, retail sales, median income, etc. A test run of this program covering 70 zones required 40 minutes. These results were edited by a second program and balanced by a third employing the method of successive approximations. The electronic computer is also used to determine driving time between zones. The computer output from the line printer, produced at a rate of 600 lines per minute, is in the form of 14″ x 22″ sheets. These are assembled side by side, photographed, and reproduced at a 7″ x 11″ size for use in final reports without retvping.

Mr. R. J. Hansen, Senior Highway Engineer, Washington Department of Highways, in his paper, stated that the use of the electronic computer has doubled the output of traffic analysis work in their State and it is being performed without any increase in personnel. In addition, the use of the computer has provided more detailed traffic analysis than could have been accomplished manually. The computer is being used on origin and destination, traffic surveys, and route analysis. Time and distance savings are converted to a dollar value permitting the determination of benefit cost ratios for various alternate new routes to permit route decisions on a more factual basis. The State highway department is using the electronic computer on two shifts. The second shift runs from midnight to 6:00 A.M. The State highway department is buying a larger computer and when delivered it will also be used for earthwork computation service for the counties.

Mr. D. L. Gerlough of the Institute of Transportation and Traffic Engineering of the University of California described in his paper the simulation on an electronic computer of freeway traffic and traffic controlled by semiautomatic traffic signals. Under the latter conditions, he has studied one hour of traffic flow in a period of 40 seconds.

Mr. S. Osofsky, California Division of Highways, stated that the first four of the following electronic computer programs have been completed and are in use in his State. The fifth program is being developed.

1. Traffic assignment to a proposed facility. The machine compares the time and distance on the freeway route against a basic route.

2. The preparation of Table W-6 for the loadometer study.

3. The preparation of a trip desire contour chart.

4. The determination of formulas for trends by the method of least squares.

5. Editing metropolitan origin and destination data.

With respect to number 2 above, Mr. Osofsky reports that the overall processing time to produce the finished tabulation now takes two to three days compared with the previous manual procedure which required one month.

Mr. R. E. Livingston, Planning and Research Engineer, Colorado Department of Highways, stated that they expected to use the electronic computer to analyze sufficiency ratings in relation to construction costs to produce a continuing inventory of needs and to forecast future traffic volumes.

Mr. G. E. Brokke of the Bureau of Public Roads stated that three separate programs had been developed for the determination of growth factors from zone-to-zone movements by three separate methods. These methods will be compared to determine the most accurate and suitable method and to determine how many iterations are required by each method. He also stressed the need for a program designed to correlate zone-to-zone movements with such factors as area population, distance between areas, area vehicle registration, area income, etc. Such a program would make it possible to predict zone-to-zone movements in a large area such as the entire country. He also mentioned the necessity of developing a traffic assignment program that includes variable factors such as speed in accordance with traffic volume, etc.

Photogrammetric Engineering Short Course Announced

The Massachusetts Institute of Technology has announced a two-week course in Photogrammetric Engineering, beginning Monday, July 15 and ending Friday, July 26, 1957.

The remarkable growth of photogrammetric mapping activity in recent years has had a substantial technologi-

cal and economic impact on many phases of civil engineering. The increasing interest in this field is responsible for this course, which will present an opportunity for practicing engineers to review the underlying principles of photogrammetry and to survey recent advances in application of these principles.

Applicants must apply on a form available from the Office of the Summer Session, Room 7-103, Massachusetts Institute of Technology, Cambridge 39, Massachusetts. Tuition for the 2-week program will be $250.

Hoffman Award for Traffic Safety Workers Announced

The public service of men and women who provide the professional know-how in the fight against traffic accidents will be honored through the new Paul Gray Hoffman Award, it has been announced by the Automotive Safety Foundation.

Mr. Hoffman, (Hon.-Mem., ITE), former president and chairman of the Foundation, is a foremost pioneer of the nation's highway safety movement. Formerly head of the Studebaker Corporation, and former ECA Administrator, he is a member of the U. S. delegation to the United Nations.

The purpose of the new award is to give recognition and encouragement to the educators, engineers, enforcement officials, researchers, organization staff members and others who make their careers in traffic safety.

"In the years I was active in this movement," Mr. Hoffman said, "I felt that the amateurs in the safety field got adequate recognition but the professionals far too little. It is the day-by-day work of thousands of these dedicated people that has been responsible for the substantial reduction in our accident rate."

Beginning in 1957, one recipient will be chosen annually for 10 years for outstanding achievement. The award will be a sculptured silver plaque.

A distinguished Board of Judges will select the winners from nominations submitted to the Foundation. Members include:

General Alfred M. Gruenther, President, American Red Cross; Dr. John A. Hannah, President, Michigan State University; Mrs. Raymond B. Sayre, Chairman, Women's Group, President's Committee for Traffic Safety; Herschel D. Newsom, Master, The National Grange; and Arthur T. Vanderbilt, Chief Justice, Supreme Court of New Jersey.

All persons whose current employment in the traffic safety field represents their principal means of livelihood will be eligible for an award. The "traffic safety field" is defined as all activities described in the "Action Program" of the President's Highway Safety Conference, which is the accepted charter for organized traffic safety throughout the United States.

Closing date for nominations for the 1957 award is September 1. Candidates may be nominated by any individual, or by any local, state or national group. Nominations should be addressed to the Automotive Safety Foundation, 200 Ring Building, Washington 6, D.C.

President's Committee Calls Conference of Officials

A conference of traffic safety officials is being planned for December, 1957, it has been announced by Harlow H. Curtice, chairman of the President's Committee for Traffic Safety.

The announcement was contained in a letter sent by Mr. Curtice to presidents of some 20 organizations of public officials. The conference, according to Mr. Curtice, will be held in Washington on December 9 and 10, 1957, with attendance limited to representatives of official groups.

As a preliminary to the conference, each organization of officials has been asked to develop a report evaluating the key needs for controlling traffic accidents. Specifically, each organization is asked to assess the status of traffic accident prevention in relation to recommendations of the Action Program, establish immediate and long-range needs, assign priorities to these needs, and indicate those for which public support is particularly essential.

These reports, it is planned, will be considered at the Washington meeting, and a final report developed for consideration at a series of regional public support conferences in 1958. These conferences, following the regional pattern of 1956, would have the purposes of stimulating interest in the Action Program and of building citizen support for the immediate and long-range needs given priority by public officials.

The Institute of Traffic Engineers has been invited to participate in this activity, although it has been pointed out that the Institute includes within its membership officials and non-officials. Institute members selected to attend the Washington conference will, of necessity, be drawn from the officials within Institute membership. J. Carl McMonagle, President of the Institute, to whom Mr. Curtice addressed his letter, has announced that the subject would be discussed by the Board of Direction at its June meeting in Houston and suitable action taken toward the creation of a special committee to act for the Institute.

(Continued on page 444)

MOTOR VEHICLE DEATHS AND DEATH RATES

1955, 1956 and 1957

Month	1955	1956	1957	1955-57 Change	1956-57 Change
January	2,810	2,990	2,860	+ 2%	— 4%
February	2,319	2,720	2,540	+10%	— 7%
March	2,602	2,920	2,920	+12%	0%
Three Months	7,731	8,630	8,320	+ 8%	— 4%
April	2,753	2,930			
May	3,101	3,170			
June	2,982	3,290			
July	3,350	3,570			
August	3,586	3,610			
September	3,446	3,710			
October	3,918	3,460			
November	3,559	3,690			
December	4,000	3,940			
Total	38,426	40,000			

All 1955 figures are from the National Office of Vital Statistics.
All others are National Safety Council estimates.

Strictly Business

Plywood Used for Street Stencils

Traffic departments in several West Coast cities report that a new material has solved many problems connected with street stencils used to stencil the words "STOP", "SLOW", etc. on streets and highways.

The material, developed by the Harbor Plywood Corporation, is called Harborite, and is Douglas Fir Plywood with a resin-impregnated overlay that's extraordinarily tough and smooth. Unlike ordinary plywoods that "rupture" when excess paint is scraped from the face, and consequently last only for a few weeks, some Harborite stencils have been used for six months and are still in good shape, according to street maintenance men.

The traffic departments of Los Angeles, Long Beach, Pomona, Compton, Newport Beach and Sierra Madre are now using Harborite for street stencils with excellent results.

Along with providing a super-smooth surface from which excess paint can be easily removed, Harborite offers several other advantages to stencil users. Its great rigidity and strength make it easy to cut and to handle; its resistance to water and weather gives it longer life; and its ability to stand up under rough treatment makes it far more economical in the long run.

Traffic engineers and maintenance men interested in testing Harborite may obtain free samples and more information by writing to Harbor Plywood Corporation, Aberdeen, Washington.

Baltimore to Use Emergency Traffic Control System

EL-TEC, the electronic traffic cop that makes it possible for emergency vehicles to control traffic signals during actual emergency runs, has received unqualified backing from Henry A. Barnes, Director of Traffic for Baltimore, Maryland.

Barnes stated: "As a result from having 10 firemen killed and 27 injured during the past five years because of traffic accidents, the City of Baltimore is now installing a pilot system of emergency vehicle traffic radio control that has been successfully tested during the past eight months. Now, for the first time, this radio system offers a satisfactory and efficient means within economic bounds to once and for all solve this very serious problem."

While making an inspection tour of the laboratory and manufacturing facilities of Electronic Protection, Inc., Barnes completed negotiations for making a sizable addition to the EL-TEC experimental system that was installed in downtown Baltimore and has been undergoing a continual test for the past eight months.

Long an advocate of "dashboard control of traffic by emergency vehicles" Barnes has been progressive in harnessing electronics to traffic safety and traffic problems. An outstanding example of this is the integration of EL-TEC into Baltimore's traffic light control system, the first city in the million-plus population to take the step.

In the relatively short time that EL-TEC has been available, its acceptance has been meteoric. It is now used in such cities as Ogden, Utah; Jackson, Michigan; New Haven, Connecticut; White Plains, New York; Newark, New Jersey; Highland Park, New Jersey; Maplewood, Missouri; Havana, Cuba; and suburban communities of Chicago, Illinois.

Sunshine State Uses Tassco Signs

Traffic on the new Sunshine State Parkway, now completed from Miami to Fort Pierce, Florida, is guided by Tassco signs along its 110 mile length. The signs, produced by Traffic & Street Sign Company, Newark, New Jersey, are all aluminum with reflectorized "Scotchlite" facings. The large units, such as at exits, feature interlocking aluminum extrusions, with cut-out letters aluminum riveted and "Scotchlite" faced. All signs are mounted on

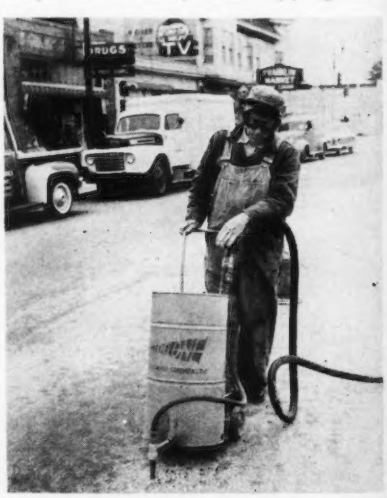
aluminum I-beams. The overall design and specifications, it is claimed, result in maximum visibility, no maintenance, and minimum deterioration from the effects of the local climate and weather.

Portable Sandblaster Devised to Remove Paint Markings

A new traffic line remover has been produced by Cyclone Sandblast Equipment, 42 Clara St., San Francisco, California.

Among the advantages claimed for it is that one man is in entire control of the operation (with most larger equipment, two men are needed since a man must be stationed to shut off the equipment).

The unit is very mobile, for it can be pushed as easily as a shopping cart.



When used in traffic, the sand does not fly from the machine to such an extent as to obscure driving vision; even pedestrians are not bothered, it is said. No excessive sand deposits are left that need to be cleaned up.

The equipment erases about a foot a minute of average worn highway line. While it is particularly adapted to repair jobs, it has been used for at least one big job—some twenty miles of San Pablo Avenue in Berkeley, Oakland and Emeryville, California.

In addition to line removing, the equipment can be used for general blast cleaning purposes in the shop, such as preparation of surfaces for repainting, plating, etc.

William G. Klett

William G. Klett (Assoc. Mem., ITE) died May 4 in St. Paul after an illness of several weeks.

At the time of his death, Mr. Klett was assistant traffic and planning engineer in the Minnesota Highway Department. He had joined the Highway Department in August, 1925, as a draftsman, and had occupied a number of positions in his advancement. His work in engineering for maximum efficiency and safety in traffic movement and control made him known to hundreds of county, city and village officials throughout Minnesota.

Mr. Klett was active in engineering, civic and church organizations. In 1950 he was Vulcanus Rex (Fire King) of the St. Paul Winter Carnival. He had been president of the Engineers Society of St. Paul, and was at one time state secretary of the Junior Association of Commerce, as well as chairman of the St. Paul Open Golf Tournament sponsored by the St. Paul Jaycees. He was a member of the Minnesota Surveyors & Engineers Society.

ACCENTUATE THE POSITIVE

(Continued from page 417)

approaching traffic problems from an exclusively negative, regulatory viewpoint. Regulations are, by and large, palliatives—they do not cure. They offset one kind of friction with another kind of friction. I am not suggesting that regulatory measures are dispensable. I am suggesting that the recommendation of a regulatory solution to a traffic problem by a traffic engineer carries with it the implicit concession that the engineer can conceive no feasible, positive solution to the problem.

Traffic laws, like traffic engineering, are the product of the problem. Lawyers and legislators badly need the guidance of traffic engineers to advise and guide them in the framing of such laws, but I am sure that all lawyers would gladly forego the pleasure and privilege of working with members of your fraternity in the drafting and compilation of volumes of regulatory measures which engineers in general, and traffic engineers in particular, can make unnecessary to a great extent by creative, intelligent and constructive attention to potential traffic problems in the planning of new highway facilities and in the design of solutions to existing traffic problems.

In the demonstration above, you see an unretouched photo of a Lyle Sign bent 160 degrees. By magnification, you see that the resilient enamel baked on by Lyle shows no cracking or marring whatsoever!

ANOTHER PROOF OF

LYLE'S SIGN QUALITY

Torture test shows how Lyle sign finishes resist fractures in extreme bending.

All outdoor signs are exposed to abuse. That's why Lyle Sign Engineers demand—and get—perfection in the baked enamel finish on Lyle Signs. In the most modern, electronically controlled ovens, Lyle Signs are baked at *exact* temperatures for *precise* periods of time. And, of course, Lyle Signs are clad only in the finest baking enamels available.

So, when you buy Lyle Signs, you know you are getting the best.

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Lyle

Backed by over 40 years of sign manufacturing experience.

New Appointments

B C. Hartung Appointed Asst. Managing Director California Safety

Bernard C. Hartung, (Assoc.-Mem., ITE) has been appointed Assistant to

Bernard C. Hartung

the Managing Director of the California Traffic Safety Foundation in San Francisco.

Hartung is a graduate of the University of Nevada and was for several years Personnel Manager and Safety Director in the Nevada Department of Highways. From 1942 to 1945 he served with the War Production Board both in Reno, Nevada, and Washington, D.C.

From 1945 to 1948 he was Personnel Manager and Safety Director for the Vaughn Millwork Company in Reno, Nevada, and Roanoke, Virginia. He left this position to manage the Reno Office of the California Association of Employers for a three year period, and since 1951 has been Program Director and subsequently Regional Manager of the Pacific Central Region of the National Association of Manufacturers.

In his new position with the California Traffic Safety Foundation, Hartung will be in charge of membership development and will assist in the technical services field.

Hillenbrand Appointed Executive Director County Officials Ass'n.

Bernard F. Hillenbrand has been appointed Executive Director of the National Association of County Officials.

This position has been vacant since 1953, with duties of the office performed since that date in part by the President but primarily by the Secretary, Keith L. Seegmiller.

Mr. Hillenbrand is a graduate of Syracuse University where he received a Bachelor of Arts degree (cum laude) in 1949. From the same institution he received the degree of Master of Public Administration in 1952. He had earlier completed three years of military service during World War II.

During 1951 and early 1952 he completed special research assignments with the Department of Budgets and Accounts, State of Wisconsin; the Personnel Relations Board, State of New York and as Administrative Intern with the State of New York. From 1952 to 1955 he served as Deputy Director of Municipal Research, City of Syracuse. Late in 1955, he came to Washington, D.C. as Assistant Executive Director of the American Municipal Association.

Mr. Seegmiller, who as secretary to the Association, has served as its chief administrative officer since 1953 will continue with the Association as legal counsel and liaison officer with the federal agencies in Washington, D.C. This is the work for which he was originally retained in 1945 and administrative duties had been accepted by him only on a temporary basis while the position of Executive Director was vacant.

Kahoe Named Transit Company Assistant

Edwin M. Kahoe, Jr., formerly with Baltimore's traffic engineering department, has joined Philadelphia Transportation Company as assistant to the president.

Kahoe will concentrate his activities in the traffic field, working with city officials and others to speed up the movement of transit vehicles and the general traffic flow. He will study such matters as PTC routings, bus-and car-stop locations and terminal operations, coordinating the company's program with that of the city and its Urban Traffic and Transportation Board.

Kahoe has been engaged in various phases of traffic engineering since 1946, including procedures connected with the movement of public transportation vehicles. In October 1955 he joined the Baltimore department. He attended Loyola College and the University of West Virginia and received a law de-

Edwin M. Kahoe, Jr.

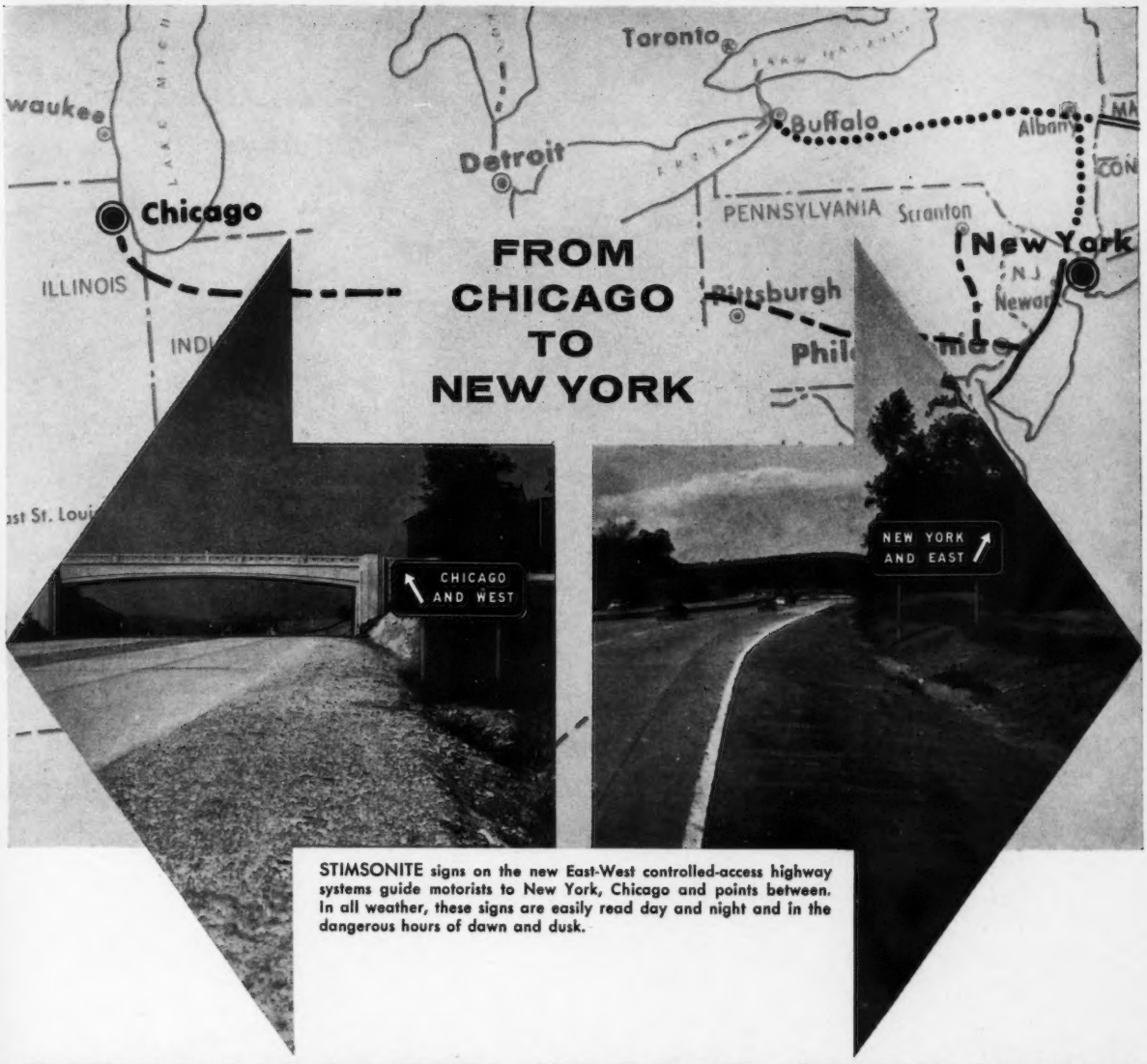
gree from the University of Baltimore Law School. He also studied engineering at Johns Hopkins University and traffic administration at Northwestern University. During World War II he was in charge of the Army's ship-maintenance installation at Seward, Alaska.

Parking Rates Increase Sharply!

This could be the headline accompanying the photograph of a sign in a

Richmond, Virginia parking lot. The truth is, of course, that the lot is a private lot and the $50 is a potential penalty for parking by unauthorized persons.

Let's hope things don't get that tough!



STIMSONITE signs on the new East-West controlled-access highway systems guide motorists to New York, Chicago and points between. In all weather, these signs are easily read day and night and in the dangerous hours of dawn and dusk.

STIMSONITE SIGNS THE WAY

Stimsonite signs help make driving from Chicago to New York, and to Boston via the new Massachusetts Turnpike, a fast, easy trip on the new controlled-access highways. For Stimsonite signs stand out . . . better than any other signs . . . at dawn and dusk, in daylight and in darkness. Brilliantly legible at all times, they are recognized as the safest signs for the high speed traffic on today's highways.

Stimsonite letters and sign borders provide maximum target value and readability. The combination of the most brilliant reflectors and the bright finish of the cut-out letters results in unequalled 24-hour performance.

Because the embossed aluminum cut-out letters, assembled with Stimsonite reflectors, are non-fading and weather-proof, Stimsonite signs are an economical choice. They never need renewing or maintenance.

Consider the visibility and economy of Stimsonite signs when you plan your signing program.

STIMSONITE® *for* *Seeability* *Readability* *Durability*

AGA DIVISION

ELASTIC STOP NUT CORPORATION OF AMERICA

1027 NEWARK AVENUE, ELIZABETH 3, NEW JERSEY

proved *superior* **to steel, aluminum, fiberglass** *and other sign materials!*

HERE'S PROOF OF HARBORITE'S SUPERIORITY

Illustrated above is just one of many vandalism and abuse tests conducted by the Douglas Fir Plywood Association proving conclusively that overlaid plywood is far superior to other materials for all types of outdoor signs and displays. Signs tested were made of fir plywood, steel, aluminum, glass fiber and overlaid fir plywood. These findings have also been further backed by state and municipal government tests throughout the country.

(Mail coupon at right for copy of the official test results.)

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Aberdeen, Washington

Sales offices and warehouse stocks in: ABERDEEN • ATLANTA • CHICAGO • CINCINNATI • HOUSTON •

HARBORITE®

the miracle overlaid fir plywood...super-resistant to wear, weather and water!

SIGNS MADE OF HARBORITE

LOOK BETTER...
LAST LONGER...
COST LESS IN THE LONG RUN!

Whether for traffic directional and warning signs or huge bulletins, sign makers throughout the country report Harborite is easier to work... holds its shape better... and requires less maintenance than any material ever used before. Harborite is finest marine grade plywood plus a tough, abrasion resistant face... greatly increasing over-all strength... providing a hard, smooth, grainless painting surface.

21 REASONS WHY YOU SHOULD USE HARBORITE

- Waterproof
- Weatherproof
- Superior Paintability
- Resists Dents
- Won't Split
- Won't Bend
- Won't Crack
- Won't Check
- Won't Rust
- Heat, Cold Resistant
- Resists Vandalism
- Great Strength
- Lightweight
- Rigid and Flat
- Easy to Work
- Less Framing Needed
- Large Size
- Choice of Thickness
- Many Re-Uses
- Long Life
- Moderate Cost

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LOOK AT HARBORITE'S SPECIAL CONSTRUCTION!

1. Only select Douglas Fir veneers are used in Harborite.
2. Core veneer strips are machine-edged and butted tight.
3. 100% solid wood in all veneers... no hidden flaws.
4. Harbor-developed glue assures permanent weld.
5. Panels rehumidified to minimize warping and grain-raise.
6. Resin impregnated overlay permanently fused to the core.

HARBOR PLYWOOD CORPORATION 6-TE
Aberdeen, Washington

Check One or Both:

☐ Please send copy of Douglas Fir Plywood Association test booklet.

☐ Please forward sample of Harborite and additional information.

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OUSTON • INDIANAPOLIS • JACKSONVILLE • LOS ANGELES • SAN FRANCISCO • SEATTLE • TAMPA • **Other major cities**

New Publications

Expressway Laws — Are Yours Adequate?

Automotive Safety Foundation, 200 Ring Bldg., Washington 6, D.C. 23 pp.

The present total of some 6300 miles of toll-free expressway in the U.S. is going to increase substantially as the new highway program gets underway. The legal aspects of an expressway must be considered if this development is to take place smoothly and quickly.

This report attempts to answer in everyday language ten major problems as the most likely trouble spots in this field. Suggested in each case are areas of highway law which may need attention by administrators, legislators and citizens.

American Standard Inspection Requirements for Motor Vehicles

D7.1-1956, American Standards Association, 70 E. 45th St., N. Y. 17, N. Y., 1957, 19 pp., $1.00.

This American Standard replaces an earlier edition of 1941. Notable changes have been made, particularly in the inclusion of standards for brake performance, which were not included in the earlier edition. Major changes have been made in other sections also, so the publication is almost completely new.

The standard was sponsored by the AAMVA and the Association of Casualty & Surety Companies, and was developed by a committee which included Institute of Traffic Engineers representation.

Expressway Law

Special Report 26, Highway Research Board, 2101 Consitution Ave., Washington 25, D.C., 1957, 108 pp., $4.00.

The Highway Laws Committee of the Highway Research Board has prepared this study of expressway laws.

While endeavoring to point up those elements of the law essential to an adequate expressway statute, the Committee took cognizance of the general condition of highway laws today. A state with modern, integrated highway laws might have no need for an expressway statute—but probably not more than one or two states have such functionally organized highway codes.

The report recognizes this situation, and adopts an intermediate approach.

Pertinent materials from statutes of all states are included. More than 1500 judicial decisions were reviewed, and a substantial number have been incorporated in the report. Access control has been given important attention.

The report will be of interest and help to highway lawyers, highway administrators, engineers, planners, legislators and others interested in a modern highway system.

Highway Administration

Bibliography 19, Highway Research Board, 2101 Constitution Ave., Washington 25, D.C., 1957, 45 pp. plus indices, $1.00.

This bibliography, an outgrowth of work of the HRB Committee on Highway Organization and Administration, is the first one in this area.

No attempt has been made to include all possible items. Those included were picked carefully to be representative. In general, the items included cover the past ten years.

Three hundred sixty-two items are included, grouped into headings as follows:

Subject	Items
Public Administration	1- 28
Gen'l Highway Administration	29- 52
State Highway Administration	53- 73
Local Road Administration	74-105
Administrative Studies of Specific Organizations	106-201
Inter-Governmental Relations	202-236
Personnel Administration:	
General	237-246
Salary and Wage Practices	247-249
Job Classification and Evaluation	250-256
Incentives	257-259
Engineering Manpower and Productivity	260-278
Civil Service and Merit Systems	279-284
Recruitment and Training	285-308
Retirement and Social Security	309-315
Public Relations	316-331
Highway Laws	332-337
Fiscal Control	338-353
Highway Planning	354-362

Night Visibility — 1956

Bulletin 146, Highway Research Board, 2101 Constitution Ave., Washington 25, D.C. April 1957, 82 pp., $1.60.

This bulletin contains eight papers presented at the 35th Annual Meeting of the Highway Research Board, as follows:

"Highway Lighting and Accidents in Indiana," by James D. Blythe.

"Validity of the Night Sight Meter," by A. R. Lauer and Earl Allgaier.

"Sign Brightness in Relation to Position, Distance, and Reflectorization," by Arthur L. Straub and Terrence M. Allen.

"An Experimental Study of Four Methods of Reflectorizing Railway Boxcars," by A. R. Lauer.

"Effect of Street Lighting on Night Traffic Accident Rate," by Francis D. Wyatt and Edmund Lozano.

"A Configuration of Taillights and Brakelights," by F. C. Breckenridge.

"Vision at Levels of Night Road Illumination II. Literature 1952-1956," by Oscar W. Richards.

"Principles and Figures of Merit for Roadway Lighting as an Aid to Night Motor Vehicle Transportation," by Charles H. Rex.

Highway Curves and Test Track Design

Bulletin 149, Highway Research Board, 2101 Constitution Ave., Washington 25, D.C. April 1957, 56 pp., $1.00.

Of the two research reports contained in this Bulletin, the first describes the principles of test tracks designed for automotive proving ground operation. Such test tracks, it is pointed out, must be designed to permit testing vehicles over wide ranges of speeds and many conditions of operations. Usually the design of the cross-section of a test track differs from that of a highway in that is has greater width and may reach a much higher rate of superelevation on high-degree curves, in order to hold the size of the proving ground within a reasonable, economical, land area. This paper gives many interesting details of the design and layout of horizontal transition spirals, and vertical curves for spiral easments.

The second paper describes and analyzes human sensitivity to motion as a proper criterion in the design of highway curves. Applications of such motion sensitivity evaluations in the design of vertical and horizontal highway curves and transitions are developed and demonstrated by examples taken from automotive proving ground operations.

Perhaps the greater need of highway engineers for this kind of information will be in the design of vertical curves, such as sags, crests, dips, and rises, particularly within and around traffic interchanges and grade separation structures.

Secondary Road Program in North Carolina

Bulletin 147, Highway Research Board, 2101 Constitution Ave., Washington 25, D.C. April 1957, 27 pp., $0.60.

This report, by James S. Burch, was presented at the Thirty-Fifth Annual Meeting of the Highway Research Board, January 17-20, 1956. It presents data on the State expenditures of some $350 million within a five-year period, and $478 million in nine years on improvements to the North Carolina secondary road system.

The report presents complete vehicle-mile and road use analyses by geographical areas before and after the large paving program, relates traffic transfer and traffic generation to land use, makes comparisons with other states without such a program, and presents similar data on the Federal-aid secondary portion of the system.

Considerable data are presented showing the contemporary growth of factors which contribute to a "better way of life" based on factual North Carolina records. Such growth factors are reflected in data on agriculture, livestock, milk, poultry, rural telephones, motor vehicles, electricity, health, employment, education, level-of-living index, voting, library service, rural industry, etc.

Highway Lighting

Technical Bulletin No. 222, American Road Builders Association, World Center Bldg., Washington 6, D.C. 1957, 10 pp., $0.50.

A committee of the ARBA has assembled a bulletin summarizing some of the more important factors to be considered in the design of a highway lighting system. Not technical in nature (despite its name), the bulletin makes reference to IES standards, but does list specific elements requiring consideration when considering lighting on expressways and rural trunk highways.

Effect of De-Icing Chlorides on Vehicles and Pavements

Bulletin 150, Highway Research Board, 2101 Constitution Ave., Washington 25, D.C. April 1957, 31 pp., $0.75.

This bulletin contains three papers presented at the 35th Annual Meeting of the Highway Research Board, January 17-20, 1956.

The first paper, "Studies of Salt Scaling of Concrete," by George J. Verbeck and Paul Klieger of the Portland Cement Association, presents data confirming work of another investigator that greater amounts of surface scaling occur with intermediate and relatively low concentration of de-icers. New information on the effect of de-icers is also presented.

The second paper, entitled "Effect of De-Icing Salts on the Corrosion of Automobiles," was presented by Ralph J. Wirshing, Head, Chemistry Department, Research Staff, General Motors Corporation. This report gives the result of a survey of corrosion of automobiles in a number of cities.

The third report, entitled "Curing Requirements for Scale Resistance of Concrete," was presented by Paul Klieger of the Portland Cement Association. Data are presented which indicate that non-air-entrained concrete is not resistant to scaling and that a minimum curing period is necessary before air-entrained concrete is resistant to scaling.

INTERSECTION DESIGN

(Continued from page 414)

yield regulations. In addition: (1) the angle of vision in both directions is better at right angles, (2) the area of potential conflict is smaller, and (3) head-on collisions are prevented. Figure 9 illustrates these advantages of right angle crossings.

The Influence of Maneuvering Time on Relative Speed

Maneuvering time is the time required by drivers to select a gap in the traffic stream they are entering. It is the time required for merging drivers to anticipate their time of arrival at the collision point so as to reach this point simultaneously with an ac-

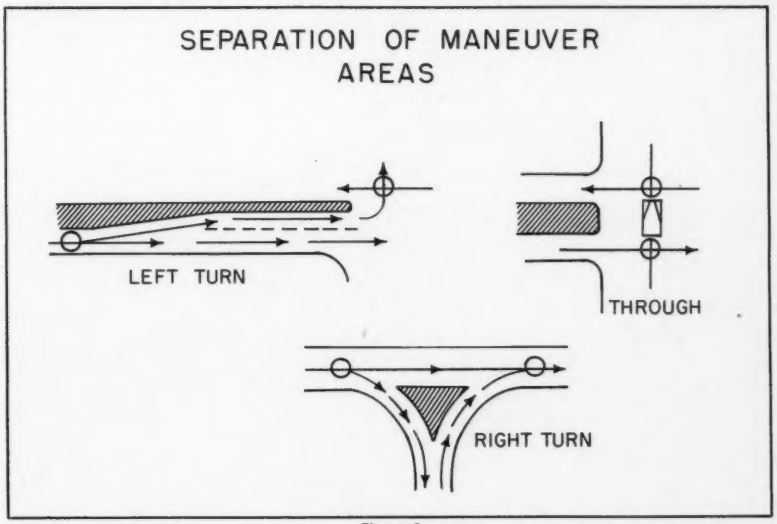

Figure 8

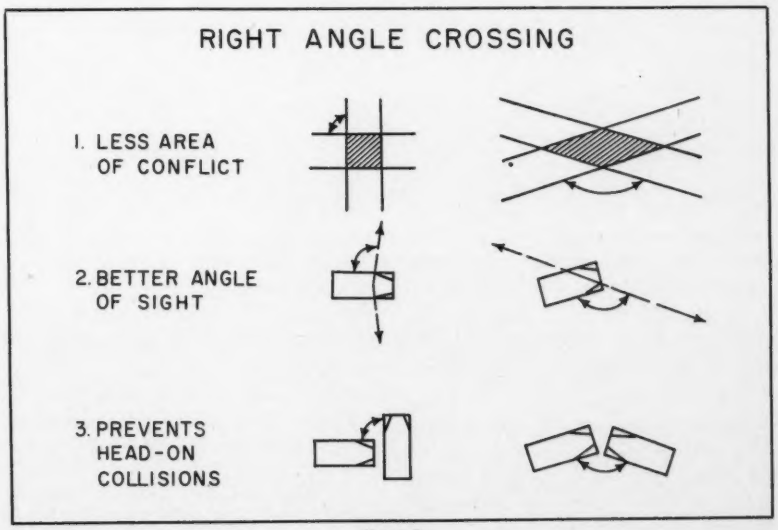

Figure 9

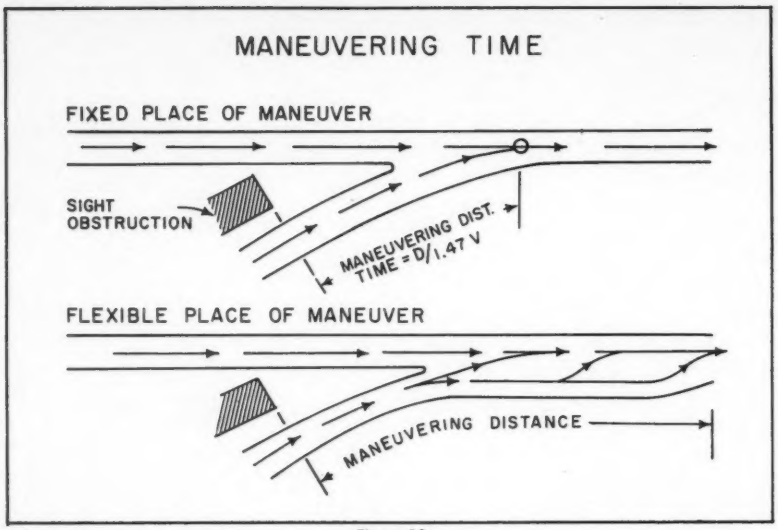

Figure 10

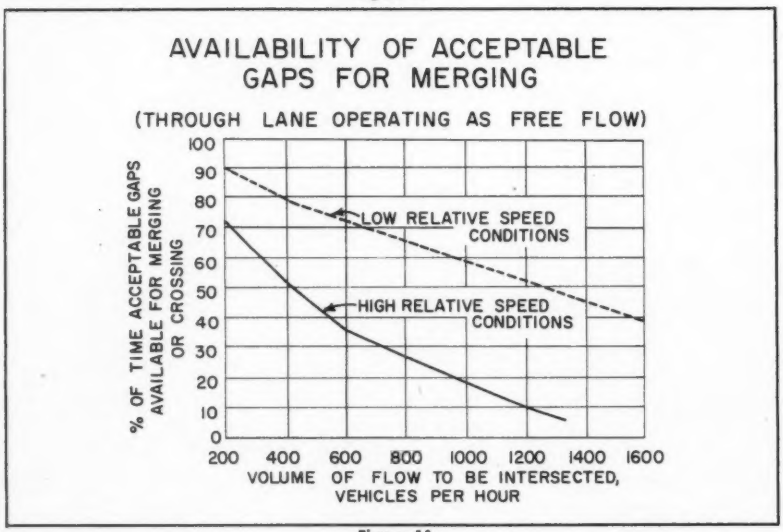
AVAILABILITY OF ACCEPTABLE GAPS FOR MERGING
(THROUGH LANE OPERATING AS FREE FLOW)
% OF TIME ACCEPTABLE GAPS AVAILABLE FOR MERGING OR CROSSING
LOW RELATIVE SPEED CONDITIONS
HIGH RELATIVE SPEED CONDITIONS
VOLUME OF FLOW TO BE INTERSECTED, VEHICLES PER HOUR

Figure 11

SOURCE—Matson, Smith and Hurd "Traffic Engineering" McGraw-Hill Book Co., Inc., N. Y., N. Y. 1955, Fig. 29-4, page 473.

ceptable gap in the intersected flow while traveling at about the same speed of that flow.

Maneuvering time is an important factor in intersection design. It may be provided in design through adequate sight distance or by flexibility in place of maneuver. Figure 10 illustrates both of these methods. Insufficient maneuvering time produces slow downs and stops which cause interrupted flow and reduced capacity.

The amount of maneuvering time required at a given intersection varies with traffic volume. As volumes increase, fewer gaps occur in the intersecting flows and longer maneuvering times are required. Figure 11 shows how often acceptable gaps will occur under various volumes of freely flowing traffic. Studies have shown that the average driver requires a 6-second gap to merge with through traffic when he enters the gap from a stopped position.[1] This average gap requirement decreases to 3 seconds when drivers merge at low relative speed. It is also reported that on the California freeways, where traffic "pressures" are caused by high volumes, merging drivers accept even shorter gaps in the through flow, (with probable increase in nervous tension).

It is believed by this writer that one of the most important advancements in the knowledge of intersection design is a better understanding of intersection maneuvering time requirements and their effects on traffic operations.

(1) Greenshields, Schapiro and Ericksen, "Traffic Performance at Urban Street Intersections," Technical Report No. 1, Bureau of Highway Traffic, Strathcona Hall, New Haven, Conn., 1947, page 71.

Coming Events

June 11-15—WESTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS—
Annual Conference, Shamrock - Hilton Hotel, Houston, Tex. Contact: R. C. Faltinson, Texas Hwy. Dept., Austin, Tex.

June 25 - 27 — INSTITUTE OF TRAFFIC ENGINEERS, WESTERN SECTION —
Cosmopolitan Hotel, Denver, Colo. Contact: Jack Bruce, Traffic Engineer, City & County Bldg., Denver 2, Colo.

September 9-13—ILLUMINATING ENGINEERING SOCIETY —
National Technical Conference, Biltmore Hotel, Atlanta, Ga. Contact: IES, 1860 Broadway, N. Y. 23, N. Y.

September 16-19—INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION—
Annual Convention, Fontainbleau Hotel, Miami Beach, Fla. Contact: IMSA, 130 West 42nd St., New York 36, N. Y.

September 23 - 27 — INSTITUTE OF TRAFFIC ENGINEERS—
Annual Meeting, Statler Hotel, Detroit, Mich. Contact: ITE, 2029 K St. N.W., Washington 6, D. C.

September 24-27 — AMERICAN ASSOCIATION OF MOTOR VEHICLE ADMINISTRATORS —
Annual Conference, Hotel Roanoke, Roanoke, Virginia. Contact: AAMVA, 912 Barr Building, Washington 6, D.C.

October 13-17 — AMERICAN INSTITUTE OF PLANNERS —
Annual Meeting, Congress Hotel, Chicago, Illinois. Contact: AIP, 34 Brattle St., Cambridge 38, Mass.

October 14-18—AMERICAN SOCIETY OF CIVIL ENGINEERS—
National Convention, Statler Hotel, New York City. Contact: ASCE, 29 W. 39 St., N. Y. C.

October 21-25—NATIONAL SAFETY COUNCIL—
Annual Safety Congress & Exposition, Congress, Conrad Hilton and other Hotels, Chicago, Ill. Contact: NSC, 425 N. Michigan Ave., Chicago 11, Illinois.

November 18-22 — AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS—
Annual Meeting, Conrad Hilton Hotel, Chicago, Ill. Contact: AASHO, National Press Bldg., Washington 4, D.C.

1958

September 16-20 — FOURTH INTERNATIONAL STUDY WEEK IN TRAFFIC ENGINEERING—
Copenhagen, Denmark. Contact: World Touring and Automobile Organisation, 32 Chesham Place, London, SW1, England.

September 22-25 — INSTITUTE OF TRAFFIC ENGINEERS—
Annual Meeting, Columbus and McAllister Hotels, Miami, Fla. Contact: ITE, 2029 K St. NW, Washington 6, D.C.

Why reflectorize both legend and background?

For years, traffic signs were put out where motorists could find them. Today, with the ever increasing volume of both day and night travel, many traffic engineers say that's not enough.

They say the sign should be placed where the motorist *does not have* to look for it. The sign must be seen, and it must be seen easily and clearly a full 24 hours every day.

To give motorists the day and night assistance of really effective traffic signs, signs should call for attention with commanding impact. Such signs show true shape, color and legend at any hour, in any weather, from any angle of approach. You get this kind of impact only from a sign reflectorized over-all with "Scotchlite" Reflective Sheeting.

⅔ of the message is left to nighttime driver's imagination by a sign with reflective legend alone. It must be read to be recognized.

A new look at shape and color

By day, when most traffic hazards are visible, the mere presence of a sign serves to emphasize a road condition ahead. But at night, when the driver can only see as far as his headlight beam, the sign is his *only* indication that there is a curve, an intersection or a change of direction ahead.

A motorist, travelling 50 miles-per-hour down a dark road can't wait to look for the sign. He may miss it, in fact, unless he can see it easily from far down the road. That's where reflective color and shape come in.

A sign with its background in vivid reflective color naturally shows its shape. Through these two characteristics alone, the nighttime driver can tell what kind of condition is coming up even *before he can read the legend.* He *sees* the sign without looking for it. It almost "looks" for him.

Then comes legend

Because the sign caught the driver's eye with the commanding authority of reflective shape and color, the driver, then, is ready for your message when he can read it . . . and the distance at which he reads it depends, generally, on the sign size itself.

Fast identification at night

Only fully reflective traffic signs give you the fast nighttime identification you want. They show all of the three sign elements that traffic engineers long ago decided were necessary to communicate effectively with the driver. A sign, on the other hand, with reflective lettering alone, can do only one-third of the job.

The big directional sign above is an example of the value of full reflectorization. The motorist sees it from way down the pike . . . and the old scramble for position to make the turn now becomes a confident, safe maneuver. Warning and regulatory signs work in the same way.

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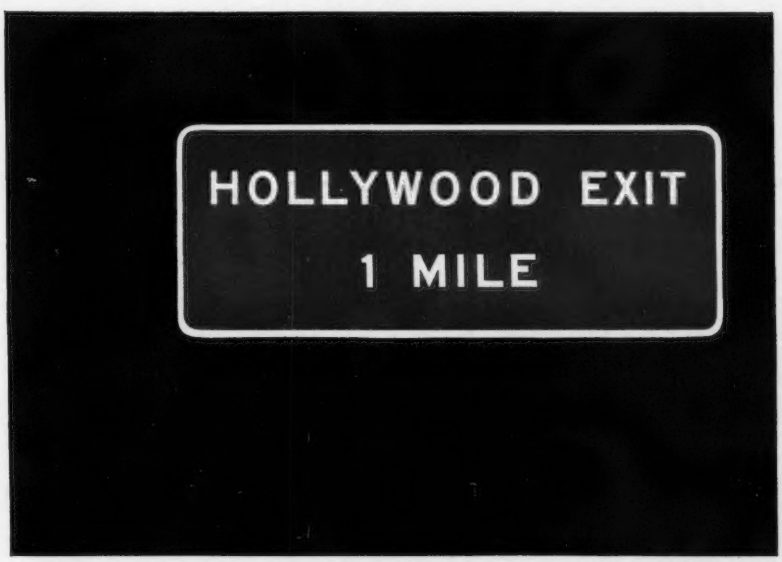
For full-time safety you need full-time performance. And no other traffic sign material gives you such steady day and night performance as Wide-Angle Flat-Top "Scotchlite" Reflective Sheeting. These vivid signs are always on the job. Foul weather does not black out their bright warning . . . and with their extremely wide angle visibility you can place each sign right where it ought to be.

* * *

Why not get more details on the value of full-time safety with reflectorized backgrounds of "Scotchlite" Sheeting from your 3M Representative? Or, for further information, write: 3M Company, Dept. GS-67, St. Paul 6, Minnesota.



A full-time sign of "Scotchlite" Sheeting shows all three elements—shape, color, legend—as well by night as by day. Motorist gets full impact of the sign's purpose in time to react safely.

REG. U. S. PAT. OFF

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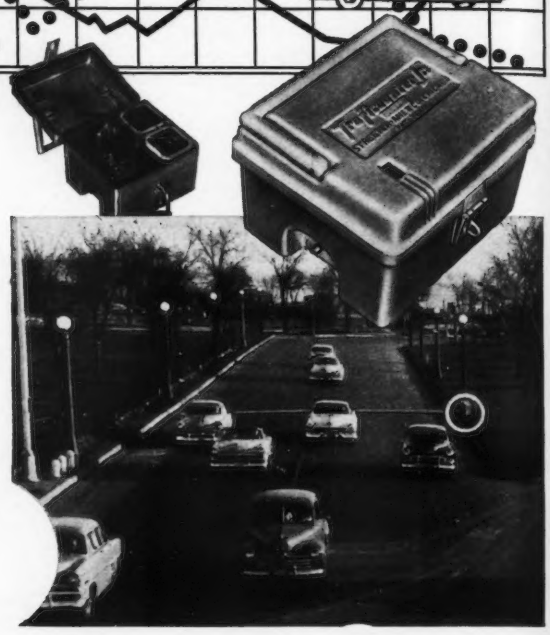

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Yearbook Changes

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Chief Highway Engineer, Porter, Urquhart, McCreary & O'Brien, 415-417 Frelinghuysen Avenue, Newark, New Jersey.

Institute Affairs

Officials Conference

Reported elsewhere in this issue is news of the 1957 Officials Conference, called by the President's Committee for Traffic Safety in Washington in December. This will be a somewhat different affair from previous Washington conferences which started in 1946 with the President's Highway Safety Conference.

In the first place, this 1957 meeting will be attended by delegations, limited in size, representing invited associations of state, county and city officials. Each of these official associations is being asked to develop a report in advance of the meeting and bring the report to the meeting with power to modify, expand or otherwise change the document in the light of general discussion at the conference. The purpose is to develop a statement by officials, setting forth their objectives and needs, particularly insofar as they are related to the need for public support. This statement of officials will form the basis for a series of regional public support conferences to be held in 1958.

The Institute of Traffic Engineers is one of two organizations not composed exclusively of officials which is being invited to participate in this conference (the other organization is the Highway Research Board). While a number of organizations will write on the subject of engineering, the importance attached to participation by the Institute is indicated by the fact that the ITE group will probably be asked to serve as secretariat for the final engineering report.

Action on this project will be taken at the June meeting of the Board of Direction, and there should be more to report shortly thereafter.

ITE Insurance Plan

The initial enrollment period for the Institute insurance plan has closed, with 308 members enrolled. This total, which represents almost eactly 30 per cent of the Institute membership, exceeded expectations of the insurance company, and was very pleasing to the Insurance Committee of the Board and the Trustees of the insurance plan.

Policies are being written now by the insurance company and are being forwarded to the Trustees. Upon receipt of each policy, the Trustees issue a certificate of participation to insured members, which certifies that the policy has been issued and is being held by the Trustees. These certificates are being mailed rapidly, and all insured members should receive theirs soon.

A number of applications for transfer in membership grade are coming before the Board of Direction at its meeting in June, and undoubtedly many of these will include insured members. In those cases where an insured member is advanced in grade by action of the Board, he will be eligible immediately for an additional amount of insurance. He must subscribe for this additional amount within 60 days or drop out of the Plan. Full details will be forwarded by the Secretary of the Trustees immediately following Board action.

New members coming into the Institute are of course eligible to subscribe to the insurance plan after they have been in their membership grade for 30 days. At this point, they begin a 60-day enrollment period.

Present members of the Institute who did not subscribe to the insurance plan during the initial enrollment period are not eligible to subscribe unless they undergo a physical examination and provide evidence of their insurability. The only alternative to this procedure is for the Trustees and the insurance company to agree to the designation of another general enrollment period, during which the Plan would be open to all members for a given period of time. Whether or not such a new enrollment period will be designated will depend to some extent upon apparent interest on the part of presently uninsured members.

Past Presidents' Award Entries Received

Mr. C. W. Prisk, Chairman of the Past Presidents' Award Committee, has indicated that several entries have already been received for the 1957 Past Presidents' Award. He calls attention to the fact that the deadline is July 23—two months prior to the date of the Annual Meeting — and urges other eligible members to forward their entries to him as soon as possible.

Competition is open to all Junior and Associate members under 35 years of age. The entry is to consist of a report (which need not be of college thesis length) of original research work carried on under the direction of the member. If it has been previously published, the publication must have been within three years prior to July 23, 1957. No entry form is necessary —the paper is the important thing.

If you are eligible, how about forwarding an entry before July 23? If you are not yourself eligible, how about encouraging one of your eligible associates or friends to submit an entry?

Detroit Plans Progressing

You have already received at least two mailings from Detroit in reference to the Annual Meeting scheduled to begin on September 23. Enough materials have passed through your headquarters office to indicate that a very fine meeting is being planned. We hope, along with all the Detroit and Michigan Section members, that you will plan to attend.

Several new features are being planned, a few of which are far enough along for discussion. For instance, it is hoped that a meeting can be held for all Local Section officers. This will be the first time these people have ever met together to discuss common problems. Also under discussion is the possibility of setting aside a meal period or other time for meetings of some of the Local Sections. The Southern Section has already indicated its desire to have a Section meeting at Detroit, and there may be other Sections similarly interested.

One luncheon period will be set aside for various university alumni groups. The Yale alumni have for many years had a luncheon meeting — Illinois alumni met for breakfast in San Francisco and may want to have a luncheon meeting this year in Detroit. How about Michigan alumni, Cornell alumni, California alumni, or some of the other groups with a number of graduates represented in the Institute membership? Are any of you interested?

International Traffic Engineering Conference

Listed in the "Coming Events" schedule of this issue is a meeting in 1958,

just before our scheduled Miami Annual Meeting. This is the fourth International Study Week in Traffic Engineering, to be held in Copenhagen, Denmark, September 16-20, 1958.

This Study Week, which follows earlier ones held in Holland in 1953, in Switzerland in 1954, and in Italy in 1956, is under the sponsorship of the World Touring and Automobile Organisation, in conjunction with the Permanent International Association of Road Congresses and the International Road Federation.

Although the program for the Copenhagen meeting is not yet in final form, the tentative agenda includes the subjects of traffic analysis, all-purpose roads and streets, accident analysis, motorways, urban roads and streets, and parking. The general operation of the meeting is expected to be similar to that of the Stresa, Italy, meeting held last year. This meeting, incidentally, was attended by 450 traffic engineers, but included only 2 from the United States. One of these, W. S. Homburger, reported interestingly on the Stresa meeting in the January, 1957, issue of TRAFFIC ENGINEERING.

It is hoped that more U. S. traffic engineers will attend the Copenhagen meeting. Anyone may attend upon payment of the enrollment fee of $17.00, which entitles them to the documentation (available in several languages) and participation in the various social events. We are advised that the expenses of delegates to this Study Week represent business travel which can be taken account of in the preparation of one's income tax return—thereby substantially reducing the expense of the trip. It is urged that members who feel attendance at this meeting might be possible get in touch with the World Touring and Automobile Organisation, 32 Chesham Place, London, S.W.1, England.

Lists of State Traffic Engineers and Consultants

The headquarters office has recently developed a list of the state traffic engineers for each of the 48 states. Many users of the Year Book have indicated that is was somewhat difficult to pick out the key person in each state, because of similar job titles, and this mimeographed list represents the first known attempt to develop such a listing. Copies are available upon request.

Also recently published has been a list of traffic engineering consultants who are Institute members or which are firms employing Institute members. The list, which covers 16 pages, indicates name and mailing address, whether available on a full-time or part-time basis, and the geographic area served. The list will be used by headquarters to answer requests for names of consultants. The list replaces an earlier one revised in 1955. Copies have been sent to all names included on the list, but will be furnished to anyone upon request.

Joint Committee Reports

The Institute is one of three agencies making up the National Joint Committee on Uniform Traffic Control Devices. The Chairman of the ITE delegation, Wilbur S. Smith, has made the following report:

At the annual meeting of the Committee in January of this year, in Washington, D. C., a number of important matters were considered and some significant actions were taken.

1. Mr. E. H. Holmes was re-elected Chairman, Mr. Leslie Sorenson was re-elected 1st Vice Chairman, and Mr. William G. Eliot was reappointed Secretary.

2. With regard to traffic control signals, it was unanimously voted to "recommend the cleaning and maintenance of traffic control signals so that the units will never fall below 75 per cent of the original light intensity."

3. On the subject of signals, there are a number of items now under study. These include the standardization of the 12″ lens, the cost of traffic signals, the position of signals, pedestrian signals, and designs of green arrow signals. The use of multiple red lens was also assigned to the sub-committee on signals for study and future recommendations.

4. After much discussion of the design and application of pavement edge lines, the Committee decided to delete the present text of Section 137 of the Manual and to substitute new text recognizing edge lines as a subject for experimentation, encouraging further research in the field, and taking a positive stand for contrasting pavement surfaces where road shoulders are paved.

5. A new section was approved for inclusion in the Manual on reversible lane lines. This section will be as follows:

a. The capacity of many urban or suburban arterial streets and highways has been effectively increased by the use of "reversible lanes," that is, lanes that are assigned to different directions of traffic at different times of the day. Where traffic flow is greatly unbalanced and peak-hour traffic overtaxes the lanes normally available for traffic in either direction, reversible lanes can add needed capacity in the direction of heavier flow, while still leaving sufficient lanes for the lesser traffic in the other direction. On a pavement with an odd number of lanes, it is usually the center lane that is made reversible. Where there is an even number of lanes, one or both of the two center lanes are made reversible. In either case, during off-peak periods the center lane or lanes may be permitted to revert to normal two-way usage.

The proper use of the assigned lanes can be achieved by signs or by lane-direction signals (sections 284-289). In addition, however, it may be desirable to put down distinctive lane markings to indicate which lanes are to be used for reversible traffic.

6. It was agreed that a statement should be included in the Manual (Section 134) as to the intended legal meaning of a "barrier line" and that this meaning would be in agreement with that recently adopted by the National Committee on Uniform Traffic Laws and Ordinances for inclusion in the Uniform Vehicle Code.

7. The question was raised as to whether or not material dealing with highway design and intersection redesign should be deleted in future editions of the Manual. No formal action was taken, however, and a sub-committee on islands was asked to give the matter further study and to bring it to the attention of the Committee at its next meeting.

8. The development of close working relationships with the "Liaison Committee of the American Road Builders Association Industry Committee on Traffic Control Devices" was reported. Meetings have been held with the ARBA Committee, and it is expected that the suggestions and recommendations of this Committee will be carefully reviewed by appropriate subcommittees and by the entire committee on Traffic Control Devices in the future.

9. A principal item of discussion was the development of improved

standards for expressway signs. In discussing the proposals of the sub-committee on signs, it was agreed that detailed consideration would be given to each section and that the Committee's comments would be taken into account by the sub-committee in drafting a revised text for this portion of the Manual. The following notes indicate the principal matters discussed in this connection:

Sec. (4) The self-illumination of overhead signs shall be mandatory, as the general rule, subject to certain exceptions. This is a much stronger specification than the original.

Sec. (5) The normal maximum clearance of overhead signs and sign structures is to be 17 feet.

Sec. (7) Several additional warrants for overhead signs are to be added, including a large volume of nonlocal traffic, interference by roadside developments, and elevated roadway design.

Sec. (11) Some qualification is to be introduced regarding minimum letter sizes for regulatory signs, e.g., for parking signs.

The normal absence of Stop signs along an expressway is to be emphasized.

Sec. (12) The "Never Cross Median" sign was eliminated, as ineffective.

Sec. (16) The fourth "function" of guide signs is to read "Identifying routes, and directions of routes."

Sec. (21) A minimum letter size of 15 inches for overhead signs, and 10 inches for roadside signs was voted.

Sec. (29) This section is to be headed "2-mile Advance Sign," and is to include provision for more than one exit on the one sign, where needed.

Sec. (31) Leeway is to be given for location of the Keep Right Exit Sign farther in advance of the exit.

Sec. (35) Provision to be made for as many as 3 place-names on the Distance Sign.

Sec. (36) There appeared to be general agreement that this section on Services Signs should be revised to make it more generally applicable to all expressways, with and without commercial restrictions, and that it should leave to the States the determination of policy as to the use of the sign and its detailed design.

10. Section (47) of the Manual was amended to provide the following:

For emphasis, the word "No" or the numeral showing the time limit in hours or minutes may be in a reversed color arrangement in the upper left-hand corner of the sign, i.e., in white on a rectangular area of red or green.

11. A modification was adopted in Section 30 of the Manual, with a revised paragraph to be inserted as follows:

Where two main highways intersect, the Stop sign or signs should normally be posted on the lesser street to stop the lesser flow of traffic. Authoritative traffic engineering studies, however, may justify a decision to install a Stop sign or signs on the major street, as at a three-way intersection where safety considerations may justify stopping the greater flow of traffic to permit a left-turning movement.

12. Since the meeting of the Joint Committee, the Traffic Committee of the American Association of State Highway Officials has been instructed to determine the signing requirements, exclusive of route markings, for the interstate system. Careful coordination of the work of the Joint Committee and the AASHO Committee is anticipated.

Section News

METROPOLITAN (New York) SECTION

—from Arnold G. Fisch, Secretary

April Meeting

The sixth meeting of the 1956-57 season was an afternoon and evening meeting held at Newark, New Jersey on April 24.

Eighteen members and guests participated in the afternoon field trip which consisted of an inspection of operational facilities at Newark Airport including air and ground control, and a bus trip around the airport.

Following dinner at 7:00 P.M. at the Treat Restaurant in Newark, 26 members and guests attended the business meeting, which was called to order by *President Warren Quimby* at 8:30 P.M.

The color sound movie "Freeway Traffic Flow" produced by the California Division of Highways was then shown. A lively discussion on highway capacity followed the showing of the film.

METROPOLITAN MEMBER NEWS

"Teke" Wiley has been named adjunct professor of civil engineering at the New York University College of Engineering. He will teach evening graduate courses in traffic engineering.

We welcome *John I. Manning,* who recently joined the staff of the Syracuse City Planning Commission. John, who is a former member of the Mid-Atlantic Section, has joined our Section. We hope that he will be able to attend some of our meetings soon.

Donald W. Cather and *William R. McConochie,* who were temporarily in the Metropolitan area in the New York Office of DeLeuw, Cather and Co., have now returned to the Main Office of the company in Chicago. We do wish them luck!

METROPOLITAN NEWS ITEMS

Mistaken Identity

Asst. Civil Engineers *Ned Bonelli* and *Vince Robinson* of the New York City Dept. of Traffic were recently on opposite sides of Northern Boulevard, conducting a traffic survey with their measuring wheels when an off-duty policeman, noting the cane-like apparatus and Ned's ever-present smoked glasses, brought his car to a screeching halt in front of Vince. "Stay where you are, fella," the Good Samaritan gravely warned Vince, "I'll help your blind friend across the street."

Midwest Section Meeting

Jack Brady reports that some members of the New York area attended the Midwest Section Dinner Meeting in Chicago on March 22nd. The meeting featured *Fred Hurd* who spoke about the future of traffic engineering. The meeting was attended by about 96 members and guests.

A number of members of the class at the Northwestern University Traffic Institute were present at the dinner meeting. Jack indicated that he met *John M. Kaiser* and *Arthur Jazwinski,* Asst. Civil Engineers of the New York City Dept. of Traffic who were granted leaves to attend the Traffic Institute. These fellows were awarded scholarships by the Automobile Club of New York to attend the Traffic Engineering Seminar.

New Type of Marking Reduces Accidents At Turnpike Interchanges

A recent study by the N. J. Turnpike Authority shows that a new type of pavement marking at two of the Turnpike's interchanges has reduced accidents. The marking involves the placement of transverse reflective paint lines on the approaches to toll booths to warn drivers that a stop

will be necessary. Yellow paint lines are placed across the approaching traffic lane at decreasing increments, beginning approximately 800' from the toll booths. A total of 16 such lines are placed on the approach lane, 9 of which are 48" wide and 7 of which are 36" wide.

Before and after studies at two of the interchanges where this type of marking has been used reveal that rear-end type collisions have been greatly reduced. In one case, the number of such accidents was reduced from 20 to 9 during comparable 14½ month before-and-after periods, or a 55 per cent drop. At the other interchanges where this type of marking has been applied, accidents decreased by almost 64 per cent.

As a result of the experience at these two interchanges, the N. J. Turnpike Authority contemplates the use of similar markings at three other toll plazas.

MID-ATLANTIC SECTION

—from Wm. S. Canning, Secretary
Meeting

At the John Bartram Hotel, Philadelphia, the second meeting of the Mid-Atlantic Section was held on Friday, May 3, 1957.

The dinner meeting was preceded by a demonstration of Goodyear's Carveyor in the Rose Room, beginning at 4:00 P.M. A working model showing fully the operation of this new form of high speed mass transportation was on display. This model is that which was developed for the New York City Transit Authority when it was contemplating a Carveyor installation to replace the Times Square-Grand Central shuttle. It has been on display in most of the principal cities in the world.

There was no formal dinner program except the showing of a twelve minute sound movie demonstrating the Carveyor and Speedwalk (moving sidewalk) in actual operation in Aurora, Illinois. A question and answer period followed.

Counting Traffic

Those of us who have made traffic counts know that after the first few hours at an intersection life becomes monotonous and our eyes and necks become weary. In fact one gets to the point where he isn't sure whether ten or eleven cars just passed through. Such was the case of two part-time traffic counters who were employed by the City of Pittsburgh, Bureau of Traffic Planning, during school recess last summer.

One of the boys, who was going to a college in Florida, had a dark green car with Florida plates and consequently was using the car on this day. As his eyes were drooping for the count of three, all hell broke loose. An officer of the law was standing at the window with a *GUN* in his hand shouting, "All right, up with your hands, out of the car. Turn around and put your hands on the roof of the car — QUICK!" Complying with those commands, large rough hands patted them gently to see whether they had any weapons. Actually, the only weapons the boys had were several sharp pencils. The boys were then turned around and asked for their identification. In the meantime, the boys who were scared stiff, allowed their wide-open eyes to survey the scene. There were six squad cars blocking the street off, twenty some policemen and detectives with riot guns and other equipment that they never saw before and about a hundred spectators standing at a distance. As the one policeman was going through the boy's identification cards, he came across the City of Pittsburgh's identification card which is given to all City employees. He suddenly wanted to know where the boys had stolen it. This was the first opportunity that the boys had a chance to speak and it was an effort for them to say — "We work for the City. We were making a traffic count. What is this all about?" After the police had recovered from their shock they told the boys that a Savings and Loan Bank had just been robbed and that the gunmen had driven away in a dark green car with out-of-town plates. An alert nearby citizen heard the broadcast, saw the car with two suspicious men in it and notified the police. The policeman then shouted over to the Captain. "Hey, these fellows work for the City—They are traffic counters!"

A few orders were given and the red-necked officers quietly and quickly disappeared as fast as they had appeared. As the boys were getting back into the car, the one boy asked the other, "Should I count the police cars, too?"

Personal

In March, your director, *Dick Overmyer* was in the hospital. We are happy to report that Dick has recovered sufficiently to be back at his desk in Philadelphia. May we take this opportunity to wish Dick continued improvement.

MID-WEST SECTION

—from Elizabeth McLean,
Publications Committee Chairman

The April Meeting of the Midwest Section was "quite" an "affair." Noah Webster defines a soiree as "an evening party." The Midwest Section meeting defies definition. The meeting had a deceptively quiet start as *Phil* (anthropist) *Linscott* conducted a quiz about a local parking facility and awarded a bottle of Scotch to the winner. Next a *real door* prize was awarded to *Ralph Michel* for being the *most* rounded member and finally those who were too tired to move watched a fishing movie (after *Harry Oswald* finally found the speaker and got the projector focused).

Keen observers got a hint regarding the evening's proceedings when they noticed the green eyeshade protruding from *Dick Walons* pocket. Their suspicions were confirmed when they saw *"Sport" Blackman* borrow *Vince Donahue's* coin changer.

A haze of cigar smoke settled on the scene and the confusion of filling inside straights was so great that hardly anyone noticed the squeak of *Bob Zralek's* black navy oxfords as he deftly tiptoed out of the checkroom with his hat and coat.

The stork beat *Bill Bauch's* building contractor! He and Anna Mae are the proud parents of a little girl. Because the stork won, Bill is now residing in a motel while the three older children are vacationing with various kin.

J. Madison Hunnicutt is currently dickering with the editors of the *Hamster Breeders Gazette* (or was it *Life,* no matter) for an exclusive on his report to the City Council on Drag-Racing that is. The stumbling block appears to be the necessity of serializing the article since the original report was done in 27 volumes, exclusive of photos and addendum.

Rumor has reached us that *Mac Johnson* is headed back to the land of the sky blue reflectorized sheeting. We hope this rumor proves to be unfounded cause we'll lose that ride home after ITE meetings.

Frank Barker's reaction to the last ITE meeting is worth noting—he didn't know whether what had happened would drive people away, or attract people to see what might happen.

Someone must have tipped off *Pete Page* to the gag in the Parking Garages—he knew exactly where the bomb was hidden!

Ted Kopczynski reports that one of his sign crews got lost while trying to follow a route they were to re-sign.

The Midwest Section is planning an interesting outing for June 13th. A contingency of ITEr's will leave Chicago about 10:30 that morning and tour the Indiana Toll Road on a specially chartered Scenic Cruiser. Representatives of the Toll Road will go over the maintenance and communication systems used on the Toll Road.

At 5:00 P.M. the group will adjourn to Nebicht Brothers in South Bend for dinner and a short movie on the Toll Road. Members of the Ohio, Michigan and Indiana Sections are invited to join the Midwest group in South Bend for the dinner meeting. For more details contact Larry Dondanville, c/o DeLeuw Cather Co., 150 N. Wacker Drive, Chicago, Illinois.

NEW ENGLAND SECTION

—From A. Wallace Gove, Secretary

The Fourth Meeting of the 1956-1957 Season was held on April 25, 1957 at the Hickory House, Worcester, Massachusetts. The dinner and meeting was preceded by an inspection tour of the municipal parking lots, municipal parking garages, Lincoln Square Improvement Project, sites for the Salem Street Redevelopment, and the Expressway.

The President appointed the following Nominating Committee with instructions to present a slate of officers at the Annual Meeting to be held in the Hartford area,

in May: *Earl Flynn,* Chairman, *Robert Williston,* and *Edward Eames.*

The President presented a letter from *Dave Baldwin,* Executive Director of the National Organization which asked the local section to make recommendations on two matters:

1. At the Annual Meeting in Detroit, should there be a meeting of local sections' presidents?

2. At the Annual Meeting in Detroit, should there be a meeting of each local section?

In a discussion of these matters, there was sentiment expressed for a willingness to participate in a meeting of local section officers. There was a feeling that the New England Section was a close unit, and would not benefit by a section meeting in Detroit. Action on these matters was postponed until the meeting in May.

The meeting was then turned over to *Wally Gove,* Program Chairman, who introduced the Speaker, *Andrew H. Fleming,* Hearings Officer, Registry of Motor Vehicles, Worcester office, who spoke on "Personalized Accident Prevention." Mr. Fleming very ably outlined the background and functioning of the Point System for drivers recently placed in operation in Massachusetts. The talk was followed by a very lively and instructive questions and answers period.

Twenty-seven members and guests were present.

TEXAS SECTION

—from April TEXITE *Newsletter*

ANNUAL MEETING — LUBBOCK

On January 26, the Annual Meeting of the Texas Section of ITE was held in Lubbock, Texas, with *Bob Chester* filling the role of ever-thoughtful host. A total of 42 Texites were in attendance, plus a number of local guests.

Registration began on Friday evening which cleared the way for a full day of business and technical sessions on Saturday. That night members relaxed at a cocktail party, which was followed by a delightful banquet and more "un-laxing," prompted by an excellent entertainer.

In the business meeting, votes were canvassed and the following officers were elected for the current year:

President ..... *James S. Saylor*
Vice-President ..... *Winston H. Carsten*
Sec'y-Treasurer .... *William C. Brandes*

Committees were appointed to:

1. Study the feasibility of affiliating our Section with the League of Texas Municipalities, and

2. Promote the action of qualified Affiliate Members with the objective of raising their status to full Members, and attempt to secure more new members of the Section.

A good technical program had been arranged and the very capable City Manager of Lubbock, Mr. H. P. Clifton, was the lead-off man. By his remarks of welcome and a resume of traffic engineering accomplishments in that City, we knew of his vital interest and support in traffic problems.

Bill Welty told a most interesting story about the operation and capabilities of digital computers, and their potential application in the field of traffic. Bill spent his vacation in California learning in the laboratory some of the intricacies of these electronic machines.

Mr. James Lacy of the Ft. Worth District, Bureau of Public Roads, discussed right-of-way and interchange problems met in freeway design. His time was devoted mainly in the answering of the many questions put to him from the floor.

Bob Schleider explained the research work being done by the Texas Transportation Institute with the objective of correlating design with operational characteristics of expressways. Considerable field work was done by photographing moving traffic on the Dallas and Houston freeways, from which lane placement, volume and speed were obtained.

The ladies also were well cared for, on a bus tour of the City, by courteous guides —city employees of Lubbock.

The weather got out of *Bob Chester's* hands during the meeting. In fact on Sunday morning, when members were ready to head for home, a coating of sleet and ice covered the landscape for many miles around. However, to date no home-going casualties have been reported. Even *Win Carsten* got home after putting some glycerin in his car radiator on the "morning after" the hard freeze. Lucky!

Bob Chester, after recovering from his arduous duties as host, writes, "I personally and all the people of the City of Lubbock, would like to thank all of the members of the Texas ITE for the good turnout at the convention and invite them all back as soon as possible."

LONE STAR BROADCAST

Jack Keese reports (while flying over Texas from one meeting to another), that he presented a paper at the Highway Research Board Meeting in Washington, D.C. during January. It was a progress report on the Texas Transportation Institute's Project: "The Correlation of Design and Operational Characteristics of Expressways in Texas." *Bob Schleider* presented an abbreviated report on the same project at the Annual Meeting in Lubbock. Both men then presented the same subject to the 31st Highway Short Course at Texas A&M College in February.

"There were a number of members of the Texas Section in attendance at this Highway Short Course and several participated on the program. There were several talks and panels aimed at better understanding and better cooperation between the cities and the Highway Department.

"There were 42 in attendance at the 2nd Annual Traffic Engineering Short School held at Texas A&M College during the week beginning January 14, 1957. They represented cities throughout Texas and several representing the Texas Highway Department. The School is sponsored jointly by the Civil Engineering Department, the Texas Transportation Institute of Texas A&M College, the Texas Section of the Institute of Traffic Engineers, and the League of Texas Municipalities. Instruction is given by members of the staff here and practicing traffic engineers throughout Texas."

Jack also attended the "Highway Capacity School" in Ft. Worth during the week of March 11, which was conducted by the Bureau of Public Roads. *Paul Tutt* and Jack were to work with the Bureau in conducting some research on Medians as soon as the School was over.

Joe Wright says his time has been pretty well taken up in attending the Traffic Engineering and Highway Schools at Texas A&M College and also the Highway Capacity School at Ft. Worth. As a result of his sojourn at A&M he reports, "We are now planning an external origin-destination study in their area."

Jack Hulett states it is rumored that *Gene Maier* (Lone Star Gene) has named his bayou retreat "NAVAL." *Skinny DeYoung* writing from his Tree Farm: "BALI HA'I" corroborates this. There seems to be a phonetic relationship, anatomically speaking between the two retreats.

Jim Saylor says his office is about ready to go to press with a report of their activities for the year 1956, replete with pictures, graphs, etc., being the most elaborate and informative report attempted to date.

Jim also mentioned the "Texas In Review" program, which carried a story concerning traffic signal installation and operation in Dallas. This appeared all over the State of Texas on March 4, 5, or 6. The story told of all the investigation, including accident analysis, traffic counts necessary to determine warrants for signals, planning of the installation and determination of type of control. Everything was covered, including the initial studies, through the complete installation and operation.

Bob Chester writes "In December, Lubbock installed an additional 4 miles of one way streets in and adjacent to the central business district. There was very little organized opposition to them and they were very well accepted. Traffic counts showed that after the streets were made one way, traffic volumes on all of them increased from 200 to 500 per cent. Plans are in process now to install an additional four miles in the near future.

"Lubbock has experimented with the new flashing school signals. A trial installation of four signals at two locations was made. The reaction to them by the people was so favorable that two more crossings were signalized and two more are to be done

(Continued on page 443)

Summary of Existing Standards for Driveway Controls

Note: These data were collected during 1956 by the Committee on Traffic, AASHO, and are presented here for information only.

See Page 440 for Footnotes

State	Types	Driveway Widths	Driveway Angles	Islands Size	Islands Location	Number Driveways	Relation Of Drives To Property Line	Pump Setback	Intersection Location Provisions	Remarks
Arizona	Urban	30'Max. 1/	45° Min.	10' Min. 40' Desirable	At Curb	-	Flare Within Lot Line 4/	12' Min., 20' Desir.	No Sight Restrictions. Retain 20' R. Corner	
	Rural	30' Max. 2/	45° Min.	60' Min. Along R/W	At Shoulder	-		20' Min.	100' Min. To First Drive. 5/ Controlled Planting.	Where Two Driveways Exist, Guardrail Along R/W Line Between & Beyond (30' Min.) Driveways.
Arkansas	Urban	40' Max. 2/	45° Min.	25' Min. At Sidewalk	At Curb	-		-	6' Min. Dist. Corner To Be Preserved. 5/	R/W Line To Be Curbed.
	Rural	40' Max. 2/	45° Min.	25' Min. At R/W	At Hwy. Line	-		-	More Than One Drive Must Have 25' Separation Max. 30' Wide, 25' Min. Dist., Corner Pre-Served. 5/	Other Than At Intersections, Posts or Curb on Islands at R/W Line.
California		35' Max. For 25 MPH 1/ 40' Max. For 45 MPH 1/	-	16' Min.	-	-	Opening Serving Two Properties Desirable	-		75' Recessed Access Opening (Measured From Edge of Thru Pavement) Desirable, With 50' Tapers.
Delaware		50' Max. 1/ 35' Max. - Exit To One Way.	45° Min.	10' Min. At R/W	6' From Pavt. Or Ditchline	2 Max.	5' At Shoulder Line	15' 20' Angled Islands	30' Major Rural 20 Minor Rd. Rural 15 Urban 5/	Islands Marked by Curbs, Posts, Etc. Corner Sight Dist. Reserved.
Georgia		30' Max. 1/ 15' Max. 1/ (Exit Only)	-	10' Min. At R/W & At Roadway	-	1 Max. Less Than 50' Front 2 Max. Less Than 200' Front	10' Rural 5' Urban	12' Min.	No Drives Within 25' 5/	Curbs or Posts on Island, Min. 10' From Highway.
Idaho	Urban	40' Max. 1/	45° Min.	10' Min. At R/W	At Curb	-	Drive Within Property Line 4/	14' Min.	No Drive Within 5' 5/	
	Rural	40' Max. 1/	45° Min.	Min. 40' At Shoulder, 10' Min. At R/W	At Shoulder If Paved Or Oiled	-	10' At R/W Line	-	No Drive Within 50' of CL of Cross Road, or ½ R/W Width + 20'	Driveway to be Paved for 20' Or To R/W, Whichever is the Lesser
Illinois	Urban	35' Max. 2/	45° Min.	6' Min. Along Curb 10' Min. Along R/W	At Curb	-	3' Adjacent to Property	13' Min	No Drive Within 6' 5/	
	Rural	35' Max. 2/	45° Min. 3/	10' Min. Along Roadway	At Shoulder Or Not Less Than 6' From Pavement	-	5' Separation, 6' From Pavement Line	13' Min.	30' From Cross Hwy. to Driveway 6' From Pavement (40' Along 4-Lane Roads).	Guardrail or Curb, if Island Less Than 25' Long or 10' Wide.

Pavement

SUMMARY OF EXISTING STANDARDS FOR DRIVEWAY CONTROLS

State	Types	Driveway Widths	Angles	Islands Size	Location	Number Driveways	Relation Of Drives To Property Line	Pump Setback	Intersection Location Provisions	Remarks
Iowa	Urban	30' Max. 1/	60°	10' Min. At Flares	At Curb	2 3, Inter.		12 Min.	2 Entrances on Main Hwy., One on Local Street 6' Min. Distance 5/	
	Rural	45' Max. 1/	45°	15' Min. At R/W	At 10' Shldr.	2		12' Min.		
Kansas (Not Yet Standard Policy)	Urban	40' Max. 1/	90°	30' Min. At R/W	At Curb	2 To Any One Hwy. 1 On Narrow Lot	Within Prop. Line 4/	12' Min.	20' Min. Dist. 5/ (35' From Hwy. Line)	Guide Posts or Curb 10' From Hwy., Along Drives And R/W.
		40' Max. 1/	45°	30' Min. 15' Min. At R/W	At Curb	"	"	12' Min.	10' Min. Dist. (25' From Cross Hwy. Edge) – Main Street 5/ 20' (35') – Side Street	"
	Rural Undiv.	40' Max. 1/	90°	50' Min. At Longest Pt.	At Pavt. Edge	2 Max. To One Hwy.	Within Prop. Line 4/	12' Min.	100' Min. From Cross Hwy. Edge To Drive Edge – 75' Along Cross Hwy.	"
		40' Max. 1/	60°	25' At R/W	"	"	"	12' Min.	"	"
	Div. & Lim. Acc.	40' Max. 1/ Entrance	60°	25' At R/W	"	"	"	12' Min.	"	No Crossover Permitted In Median
		23' Max. 1/ Exit			"	"	"	12' Min.	"	
Kentucky		50' Max. 1/	-	Min. 5', up to 25' Drive Min. 10', For 25'-50' Drive.	At Shoulder (Or 8' From Pavement)	-	3' Min. Prop. Line	Enough to Prevent Use of R/W	At Least 5' 5/ 18' From Edge Pavement, Where No Sidewalks.	
Maine		Standard Plans Not Submitted			10' – 6" From Pavement	Generally 2		"Adequate"		Curb Island, None Closer Than 10' 6" To Pavement.
Massachusetts		20' 2/ (24' If Many Trucks)	45° If Poss.		At Shoulder	2	No Overlap, Past Property Line	12' Min.		
Michigan	Urban	30' Max. 1/ Entrance	45° Min. (Entr.)	30' Min.	At Curb	2	Flares Within Prop Line	12' Min.	Min. 10' From Curb-Prop. Line Extended	
		28' Max. 1/ Exit	60° Min. (Exit)							

SUMMARY OF EXISTING STANDARDS FOR DRIVEWAY CONTROLS

State	Types	Driveway Widths	Angles	Islands Size	Location	Number Driveways	Relation Of Drives To Property Line	Pump Setback	Intersection Location Provisions	Remarks
Michigan	Rural	30' Max. (Single Drive-24' Min. At Prop. Line, 36' Max.)	45° Min. (Entr.) 60° Min. (Exit)	75' Desirable	At Shoulder	2	Flares Within Prop. Line	14' Min.	Min. 50' From Cross Road to Drive Extended.	
Minnesota (Not Yet Standard Policy)	Urban	22' Max. 2/	45° Min.	30' Min. Curb (20' Min. At Prop. Line)	At Curb	2		12' Min.	Min. 6' 5/	
	Rural	32' Max. 2/	45° Min.	30' Min. At Shoulder Line	At Shoulder	2	30' Dist. Between Drives Of Adjoining Prop.	20' Min.	Min. 100' 5/	
Mississippi	Urban	35' 2/ Recommended (50' Max. 1/)	90° Only Shown	25' Min. overall Lgth.	At Curb	2	Flares Within Property Line	12' Min. (20' Min. If Corner Island)	Min. 30' Along Main Road 5/ 20' Along Side Road	
	Rural	35' 2/ Recommended.	60° Min.	25' Min. Overall Lgth.	At Pavement Edge	2	Flares Within Prop. Line.	12' Min. (20' Min If Corner Island)	Min. 25' If No Access To Side Road. (If Access To Side Road, 20' On Side Road & 30' On Main, To Drive) 5/	
Missouri		60' Max. 1/ 15' From Pavement.	45° Min.	Variable, Generally 10' Shorter Than Pump Island	At Shoulder Or Curb	2	Urban 5' At R/W Line Rural 10' At R/W Line	12' Min	Urban 5' Min. 5/ Rural 25' Min.	Guard Posts Or Curb Specified At Various Locations.
Nevada		35' Max. 2/ Truck Stations 50'								
New Mexico (Suggested Driveway Plan)		20' 20'	30° 30°	70' Longer Than Pump Island. 50' Longer Than Pump Island.	At Shoulder	2	All Flares Within Prop. Line.	15'		
North Carolina		50' Max. 1/ or 1/3 of Lot Frontage	45° Min. 3/	Variable Pref. 6' Length At R/W Line.	At Shoulder	2 Per Face Of Lot	5' Min. Dist. Between Drive & Prop. Line 4/	12' Min.	Not in Clear Vision Areas. Other Intersections: Min. 25' Along Main Route; 20' Along Side Road (Urban-15' Along Both Roads). 5/	No New Crossovers in Median.

SUMMARY OF EXISTING STANDARDS FOR DRIVEWAY CONTROLS

State	Driveway Types	Driveway Widths	Driveway Angles	Islands Size	Islands Location	Number Driveways	Relation Of Drives To Property Line	Pump Setback	Intersection Location Provisions	Remarks
North Dakota	Municipal	30' Max. 2/	60° to 90°		Min. Of 20° From Road Cl.	2		10' Min. 20' Min At Cor.		
	Rural	30' Max. 2/	60° To 90° (45° At Cor. Locations)	60 Min.	At Pavement Edge	2		10' Min. 20' Min Islands	Allow Setback Of R/W Line For Sight.	
Ohio		35' Max. 2/	45° Min.	6' Min. At R/W	At Curb Or Edge Of Pavement		No Flare Outside Prop.	10' Min.	No Flare Before The R/W Line Curb Intersection. Except, It Shall Be Between 12' & 20', Measured Along Curved Or Straight Curb, From Bisector Of Intersection Angle.	If Curbing Not Present, Hwy. Dept. May Install Guard Posts. Curbs Along R/W Where Sidewalks. Existing Medians Cannot Be Cut.
Oklahoma	Municipal	50' Max. 2/	90°	15' Min. Curb	At Curb	2 Max.	5' Min. Separation 4/	12' Min.	Min. 30' From Curb To Drive	
	Rural	2/ Variable From 24-50'	35° Min.	15' Min. At R/W	At Pavement Edge	2 (1 Per Hwy. At Inter-section)	Flares Within Property On Divided Highway. Approaches Can Go Past Prop. Line on Undiv.	12' Min.	50' Min. From Crossroad To Drive.	Curb Or Guideposts Along Inside of Island and Drives.
Oregon		50' Max. 1/	45° Min.	30' Min.	Min., 10' From Edge Of Pave-ment	Min. Necessary	5' Min. From Prop. Line 4/ 50' Common Approach At Common Property Line, is Permitted.	10'	Min. 10' 5/	
Pennsylvania	Urban	35' Max. 2/	45° Min.	10' Min. Along R/W 6' Min. Along Curb	At Curb	2	No Flare Outside Property	10' Min.	Not Closer Than 15' To Street Line.	Less Than 25' Islands (At Shoulder) Marked By Posts, Curbs, Etc.
	Rural Undiv.	35' Max. 2/	45° Min.	10' Min. Along Shldr.	At Pave. Edge	2	No Flare Outside Property	10' Min.	30' Min. Drive to Shoulder	"
	Rural Div.	35' Max. 2/	3/	"	"		"	10' Min.	"	"
South Dakota		40' Max. 1/	45° Often							

SUMMARY OF EXISTING STANDARDS FOR DRIVEWAY CONTROLS

State	Types	Driveway Widths	Driveway Angles	Islands Size	Islands Location	Number Driveways	Relation Of Drives. To Property Line	Pump Setback	Intersection Location Provisions	Remarks
Tennessee		30' Max. 2/	60° Min.	25' Min.	At Curb Or Shoulder		Flares Within Prop. Line	12' Min Pref. (20' Min. Pref. At Cor. Island)	Min. 25' Along Main Highway; 20' Along Side Road 5/	
Texas	Urban	30' Max. 2/	60° Min. 3/	25' Min. Edge to Edge	At Curb		No Flare Outside Property	12' Min	10' Min. 5/	Guard Posts or Curbs to Mark Drives.
	Rural	30' Max. 2/	60° Min. 3/	25' Min., Edge to Edge	At Road Edge		No Flare Outside Property	12' Min.	10' Min. 5/	"
Utah (Salt Lake County)		35' Max. 2/	45° Min.	12' Min. Overall At R/W	At Curb or Pavement Edge		3' Min. Separation		10' Min. 5/	
Virginia		30' Recom. 2/ 50' Max. 1/	60° Min.	25' Min. Overall	At Curb or Shoulder		No Flare Outside Prop.	12' Min. (20' At Corners)	30' Min. Along Major Road; 20' Along Minor Road 5/	
Washington	Urban	30' Max. 2/	45° Min.		At Curb				10' Min. From End of Curve to Flare.	
	Rural	30' Max. 2/	45° Min.		At Pavement Edge				50' Min. From Edge of Hwy. Extended to Flare	
Wisconsin	Urban	35' Max. 2/	45° Min.	6' Min. Along Curb 10' Min. Along R/W	At Curb	Min. Nec. 4/	3' Min.Separation		Shall Not Encroach on Corner Areas Needed for Traffic Control, Etc.	Posts, Curb, etc. May be Required, if Island Less Than 20' Long or 10' Wide.
	Rural	35' Max. 2/	45° Min. 3/	10' Min. 10' From Pavement	At Pave. Edge	"	5 Min. at Prop. Line, At Line 10' From Pave.		"	"

Footnotes:

1. Measured Parellel to Highway
2. Measured at Right Angles to Driveway
3. Reduced Angle for Limited Access or One-way Roadways
4. Driveways, Including Flares Must be Within Extension of Property Line
5. Measured From Intersection of R/W Lines to Edge of Driveway or Flare

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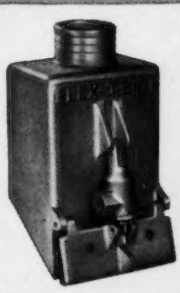

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Gopher Stamp & Die Co.
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5820 Tacony St.
Philadelphia, Pa.

National Safety Engineers, Inc.
3910 First Ave., South
Birmingham, Alabama

Standard Sign & Signal Co.
470 Main Street
Clinton, Massachusetts

Traffic & Street Sign Company
80 Foundry Street
Newark, New Jersey

Zumar Industries
1608 Essex Street
Los Angeles 28, California

(Continued from page 435)

soon. They have worked out very good and everybody is happy.

"In the next edition of the Texite, I will let you know what the newest addition to the Chester family is. The last of March is the scheduled time for his or her arrival."

Bim Greer reports that the Greers and the *Weltys* also experienced some rough going out of Lubbock. In fact they gave up in Abilene and spent Sunday night there. Next morning they had fog and more ice with which to contend. Bim further writes, "We have been doing some work on experimental signs and sign supports for expressway signing. The sign text in most cases involves the use of 15 and 18-inch letters. We are rather hesitant to adopt any standards for expressway signing until AASHO standards and the Section on Expressway Signs for the Uniform Manual are released in their approved final form." *Charlie Prisk,* Secretary of the AASHO Committee on Traffic, recently sent out to the States a 16-page questionnaire to collect data on expressway signing practices and opinions.

It is reported reliably from Austin (*Greer, M. V.*) that a total of eighteen members of the Section attended the Highway Short Course. (Good representation we'd say.) Of that number *Jack Keese, Gene Maier, Carl Braunig, Dale Marvel, Tom Hagood, Bill Welty, Bob Schleider* and *Paul Tutt* presented papers, while *Jack Keese, Joe Wright* and *M. V. Greer* served as Session Chairmen. Also our energetic but modest *Jack Keese,* with his co-worker *Bob Schleider,* it seems had the responsibility for the program, housing, meeting rooms, etc., etc., for an attendance of over 700 men. This in addition to their program participation. *Dick Oliver* and *Sam Roper* also attended the "Highway Capacity" meeting in Ft. Worth. Maybe some of the fellows came back with some new ideas on how to increase the capacity of some of our existing streets and highways.

Jos. Nadon of El Paso, the lone *West* Texas Member of Texite, had a very enjoyable trip home from the Lubbock Meeting. He and *Bob Crosby,* of radio and TV fame, had a DC-4 American Airlines plane to themselves. Nice going! Jos. reports that their City dads have finally lent a sympathetic ear to their pleas for working space, and they are now in the process of remodeling a two-story building to house their entire department. Thus they will jump from 5000 sq. ft. to 24,000 sq. ft. of office and shop area in one building, instead of being divided into three separate buildings in different parts of the City. This blessed event should take place around April 1, and their new address will be 118 South Campbell Street.

Paul Rice of Corpus Christi writes: "We have now been in operation a little over a year in Corpus Christi and I believe we are making some progress in some lines. Recently we purchased and are ready to install five hundred new parking meters. The new High Level Bridge over the ship channel and the connecting expressway is taking shape and should be ready for traffic sometime in 1958. This represents the first expressway activity in the Corpus Christi area. We are studying traffic signal locations, with the idea in mind of justifying location and, in some locations, modernizing the existing equipment.

"My new assistant, *Dean Chadwick,* who came to me from the Texas Toll Road Authority, is doing quite well in his position as Senior Traffic Engineer and I believe he should be eligible for membership in the Texas Section before too long.

"Sorry I could not make it to the Lubbock meeting, but we entertained the Texas Planning Group in Corpus Christi on Friday and Saturday of the same week the Texites were in session in Lubbock. From all indications of the weather that week, it was a good thing we stayed at home."

Jack Hulett, Texite's Roving Reporter, (Round-up Jack) sends in the following tid-bits: *"Henry DeNoble* of Springfield, Missouri, (an ex-Texan) has finally gained approval of his new planning ordinance, which he has been working on ever since he has been in Springfield.

"Bob Buckman is contending with about 52 days of continuous bowling activities at the Will Rogers Memorial Coliseum. This is the American Bowling Congress Tournament, bringing people from all over the United States.

"Stewart Fischer, Dick Conley and *Al Groves* in San Antonio are really going around like a bunch of braces and bits trying to get this new system of theirs operating."

WASHINGTON (D.C.) SECTION

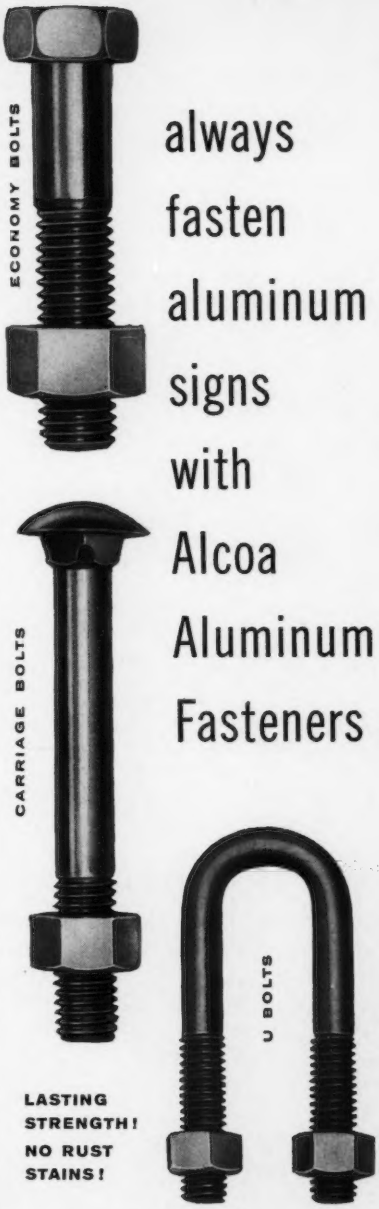
—from A. M. Voorhees, Secretary

Monthly Meeting

On April 8, 1957, the Washington (D.C.) Section of the Institute of Traffic Engineers held a luncheon meeting at the All States dining room at 514 19th Street, N. W. The luncheon was followed by a most enlightening talk by *Mr. Kenneth M. Hoover,* Project Director for the Mass Transportation Survey, and Mr. Paul Watt, Executive Director of the Regional Planning Commission. Mr. G. E. Marple, Director of the Origin and Destination Study here in Washington was unable to attend, although he was scheduled to appear on the program.

This study is attempting to determine what is the logical solution to Washington transportation ills. To carry out this objective it is considering three alternatives: A predominantly auto plan, a plan using express bus operation and a rail rapid transit plan.

It is anticipated that this study will show the costs and benefits of these three plans



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The Local Section was honored by the attendance of the Honorable *C. D. 'Cap' Curtiss,* Commissioner of the Bureau of Public Roads, as well as *Mason Butcher's* boss, Mr. Melvin L. Reese, Montgomery County Manager, and Mr. Edward Margolin, Assistant to Undersecretary of Commerce for Transportation, and Mr. Paul F. Royster, Assistant to the Federal Highway Administrator. Approximately 85 were in attendance at the meeting.

Annual Social

On April 12, 1957, the Washington (D.C.) Section of the Institute of Traffic Engineers held its Annual Social at the Wesley Heights Community Center.

The evening got underway at 7:00 with cocktails which were followed by a buffet dinner prepared and served by the world renowned gourmets—*"Shrimpboat" Mattson, "Carvin'" 'Cap' Curtiss, "Hambone" Barnes* and *George "Salad" Keneipp.* Every dish was most tasty and many of the members were seen going through the line for seconds and thirds. After the buffet there were drawings for prizes.

The evening was one of the greatest successes that the Washington Section has ever had at an Annual Social, with over 120 members, wives and friends attending.

TRAFFIC NEWS

(Continued from page 419)

Research Vehicle Acquired by M. S. U. Traffic Safety Center

The Highway Traffic Safety Center at Michigan State University in East Lansing has just acquired a traffic engineer's dream car.

It probably won't catch the public fancy in automobiles. On the outside it looks like any other 1956 station wagon in the low price field—if one overlooks the fifth wheel suspended from the rear. This resembles a bicycle wheel and its function is to measure mileage more accurately than the standard odometer.

But the inside of the car is another matter—at least for traffic engineers. Here, and under the hood are a number of statistical and mechanical devices designed to tell the research engineer a great many things about speed, gasoline consumption, distance traveled, time elapsed, braking efficiency and the wear and tear of today's highway traveling.

In addition to engineering research, the vehicle will be used in psychological studies of driver behavior on the highway.

Specifically, $10,000 worth of special equipment has been installed here by the Center in addition to a $10,000 statistical instrument loaned by the General Motors Proving Ground for research work now in progress by the Center. The only one of its kind in existence, its function is to determine operating characteristics of a vehicle. Its 51 counters record and measure such things as speed, gasoline consumption, deceleration and acceleration.

Detroiters will be interested to know that this dream car, in a test run through the motor city averaged 8 miles per gallon in downtown congestion and 16 miles per gallon on the Ford Expressway. At 4:30 p.m., 70 per cent of the time downtown was at 16 miles per hour and 30 per cent was 17 to 32 miles per hour. On the expressway it worked out at 12 per cent (of the time) for speeds 0 to 16 m.p.h.; 9 per cent, 17 to 32 m.p.h.; and 79 per cent, above 32 m.p.h.

Another device plots the speed profile of the vehicle against distance or time. On the test run in Detroit, the average speed downtown was 10 m.p.h. and on the expressway it was 42 m.p.h. Delays downtown averaged 1.7 minutes every mile and almost none on the expressway.

A concealed radar speed meter and graphical recorder measures instantaneous speed runs and gaps (of other vehicles) in the traffic stream. Speed and the distance between cars are recorded for individual vehicles near the research car.

Dr. Dolf May, a member of the Highway Traffic Safety Center staff and of the Civil Engineering department of Michigan State University, under whose direction the engineering research will be conducted, claims it to be one of the best traffic research tools now in existence anywhere.

Under the direction of Dr. Abram M. Barch, Center staff member and the Psychology department, the acquisition of driving skills and the effect of situational factors on driving behavior will be investigated.

Steinman Predicts Traffic Changes

Dr. David B. Steinman, internationally famous engineer, poet, gardener and philanthropist, forecast new traffic problems in a speech at the University of Florida where he was recently honored at the dedication of the Steinman Lounge at the College of Engineering there.

Dr. Steinman, world renowned for his work on many bridges and currently engaged in work on the Mackinac Straits Bridge, predicted that guided missiles will be used in the not too distant future for transcontinental delivery of mail and parcels. He said he believed that traffic would go from its present day use of the automobile to an era in which every individual will be able to propel himself through the air. "Our best highway planning today will seem like a minor problem when this comes to pass," Dr. Steinman said.

Most Isolated Signal Reported In Nevada

In a couple of weeks, Stateline, Nevada, will have a single, solitary, lonely traffic signal, which will make it the most remote signal in the country. Closest other one would be in Reno, 55 miles away. It is hoped they time it properly so there won't be any delay between the last one in Reno and Stateline. —clipped from *Virginia City* (Nevada) *Territorial Enterprise* by W. D. Flye, Traffic Engineer, Riverside, California.

Where but in New York Or Dublin?

The center line on Fifth Avenue in New York City, 22,000 feet of it at least, was repainted with green paint just in advance of the annual St. Patrick's Day parade which took place Saturday, March 16.

The Department of Traffic announced early in March that the renewal of the center line on Fifth Avenue was about due anyway, so the only additional cost involved in painting the line green was the extra pigment added to the white paint. This extra cost was calculated at $34.72.

27th ANNUAL MEETING
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•
DETROIT, MICHIGAN
SEPTEMBER 23-26, 1957

Membership Applications

APPLICATIONS FOR TRANSFER

BURLESON, Joe M.
Traffic & Planning Engineer, Room 2, City Hall, Council Bluffs, Iowa. April 4, 1957 for ASSOCIATE grade

DURHAM, Harold F.
Assistant Traffic Engineer, 259 Civic Center Building, San Diego, California. April 28, 1957 for ASSOCIATE grade.

KOSAI, Yoshio
Traffic Engineer, 502 City Hall, Tacoma, Washington. April 12, 1957 for ASSOCIATE grade.

WICKSTROM, George V.
Assistant Civil Engineer, Department of Traffic, 100 Gold Street, New York, New York. April 15, 1957 for ASSOCIATE grade.

NEW APPLICATIONS

ANDERSON, Clarence J.
Assistant Engineer, Washington Department of Highways, 6431 Corson Avenue, Seattle, Washington. April 16, 1957 for ASSOCIATE grade.

ANSLEY, James L.
Assistant Senior Traffic Engineer 12, Room 405, City Hall, Dallas, Texas. May 2, 1957 for JUNIOR grade.

ASPIS, Norman M.
Assistant Civil Engineer, Department of Traffic, 100 Gold Street, New York, New York. April 12, 1957 for JUNIOR grade.

BRADLEY, John P.
Assistant Traffic & Planning Engineer, City Hall, Colorado Springs, Colorado. May 1, 1957 for JUNIOR grade.

CONNER, Lee F.
Senior Traffic Engineer, Virginia Department of Highways, 1221 East Broad Street, Richmond, Virginia. April 16, 1957 for JUNIOR grade.

DANIELS, Jack A.
Engineer I, Traffic Engineering Department, 950 Jennings Street, Fort Worth, Texas. April 15, 1957 for JUNIOR grade.

FIELD, Joseph E., Jr.
Highway Traffic Engineer, Virginia Department of Highways, 1221 East Broad Street, Richmond, Virginia. April 18, 1957 for JUNIOR grade.

FREEDMAN, Allan J.
Acting Devices Engineer, Ontario Department of Highways, Traffic Section, Parliament Buildings, Toronto 2, Ontario, Canada. May 6, 1957 for JUNIOR grade.

LARKIN, William J., Sr.
Traffic Engineer, Cataphote Corporation, P. O. Box 2066, Jackson, Mississippi. April 29, 1957 for MEMBER grade.

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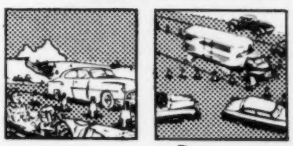

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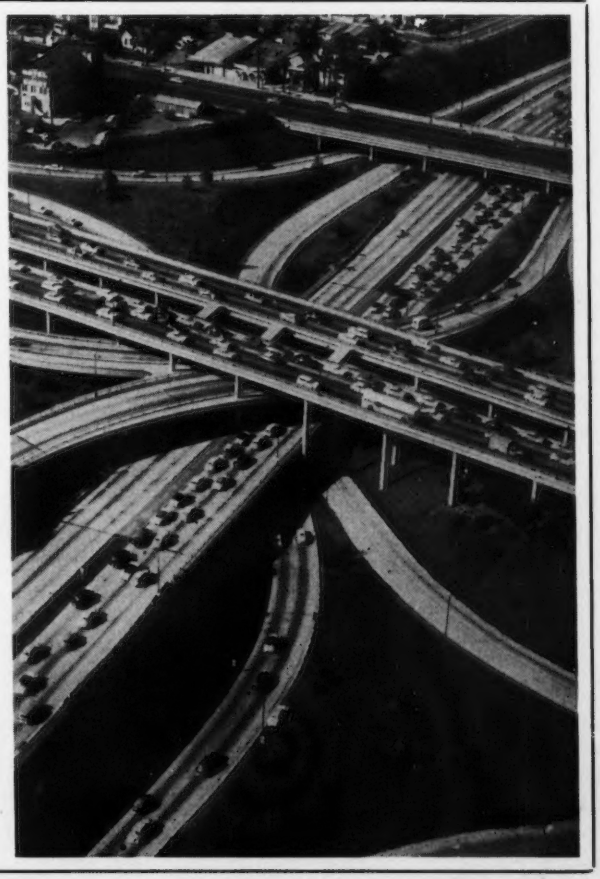

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NOTICE

Mr. Charles M. Noble, Secretary to Governor C. William O'Neill of Ohio, announces that Ohio will Edge Line Paint some 7500 miles of rural state highways on a contract painting basis. The contracts will require completion in 1957.

Prospective bidders for this Edge Painting work must make application to the Department for prequalification at least ten (10) days before the date set to open bids. Information pertaining thereto and prequalifying blanks may be obtained from Highway Credit Examiner, Ohio Department of Highways, Room 246, 450 East Town Street, Columbus 15, Ohio.

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